Chapter 2 Management Direction

Canada goose and gosling
Jennifer Brown-Scott/USFWS

Chapter 2 Management Direction

2.1 Considerations in CCP Development

The Deer Flat Refuge's purposes (see Chapter 1) serve as the foundation for this long-term conservation plan as mandated by the Refuge Administration Act. The Refuge's natural resource considerations were also fundamental in formulating the management direction for this CCP. House Report 105-106 accompanying the National Wildlife Refuge System Improvement Act states that "the fundamental mission of our System is wildlife conservation: wildlife and wildlife conservation must come first." The Service also reviewed and considered a variety of resource, social, economic, and organizational data important to managing the Refuge. These background conditions are described more fully in Chapters 1, 3, 4, and 5.

This CCP was developed using an iterative process that began with our planning team drafting a Refuge vision statement, and preliminary goals and objectives. After reviewing available scientific reports and studies to better understand ecosystem trends and recommendations for species and habitats, the team collaborated with cooperating agencies and local stakeholders to create a list of important Refuge management issues.

The public also identified issues and provided comments during the public scoping comment period July-September 2010 and again in response to preliminary draft alternatives May-July 2011. The management direction in this CCP was identified as Alternative 2, our preferred alternative, in the draft CCP/EIS, which was also distributed for public comments. All substantive comments were considered during development of this CCP, and addressed in Appendix H.

2.1.1 Definitions

To help make this chapter more user friendly, we are providing the following definitions.

Wildlife-dependent Recreation: Sometimes referred to as the "Big Six," these activities consist of hunting, fishing, wildlife observation, wildlife photography, interpretation, and environmental education. These six wildlife-dependent uses are priority activities for the Refuge as well as for all national wildlife refuges.

Nonwildlife-dependent Recreation: At the Refuge, these uses include swimming, picnicking, biking, jogging, horseback riding, boating, and water sports.

Protect: To keep from being damaged or injured. Protected acreage consists of the total Refuge acreage of each defined habitat.

Maintain: To keep in the current state; preserve; retain. Maintenance includes the continuation of current routine management or maintenance, such as the continuation of recurring weed control or management of current public use regulations.

Enhance: To improve features or quality. Enhancement includes implementing new additions to current management and ongoing future maintenance of these areas, or initiating new management, such as treating new areas and acreages for weeds and maintaining these areas during the life of the plan or implementing new public use regulations.

2.2 Summary of Management Direction

Our management direction emphasizes connecting families to nature by providing access to new facilities and a wide range of wildlife-dependent and nonwildlife-dependent recreational activities. Actions will be implemented over the next 15 years. Some actions will require additional funding, and will be implemented as funding becomes available. Project priorities and projected staffing/funding needs are included in Appendix C.

Activities will be managed to protect wildlife, reduce conflicts between users, and increase safety. Under this CCP, fishing access will be promoted, and wildlife interpretation will be emphasized and integrated into all visitor activities to increase awareness and appreciation of Refuge resources.

The Service will protect and enhance habitat throughout the Refuge. In Lake Lowell specifically, the Refuge will protect wildlife species' shoreline feeding and nesting sites from disturbance through no-wake zones and seasonal closures. Our management direction provides protections and enhancements for Refuge wildlife, and upland and on-water recreational opportunities.

2.2.1 Management Actions Specific to Each Refuge Unit

2.2.1.1 Lake Lowell Unit

Management of Wildlife and Habitat

Our management direction provides needed protections for lake-dependent wildlife by establishing a 200-yard no-wake zone along the south side of the lake between Parking Lots 1 and 8. The entire lake will continue to be closed for the benefit of wintering and migrating birds from October 1 through April 14 each year. No-wake zones will also be required in the Narrows, and the existing no-wake zone on the southeast end of the lake will be expanded to start at a line between Gotts Point and Parking Lot 1. In the no-wake zones, boaters will be allowed to travel at speeds that do not create a wake (generally less than 5 mph). We will also create seasonally closed areas, such as heron rookeries, eagle nests, and grebe nesting colonies, to protect bird species.

Specific wildlife and habitat management objectives in this CCP include the following.

- Maintain 100 acres and enhance 250 acres of emergent wetland plant beds along the lake shoreline.
- Maintain 350 acres and enhance 560 acres of mudflats to benefit migrating shorebirds.
- Maintain and enhance 6,430 acres of open-water habitat to benefit migrating, nesting, and wintering waterfowl and waterbirds.
- Maintain 520 acres and enhance 1,200 acres of riparian forest habitat at Lake Lowell Unit.
- Maintain 70 acres and enhance 85 acres of nonlake wetland basins in three units to diversify wetland habitats and improve water quality.
- Maintain 520 acres and enhance 300 acres of sagebrush-steppe habitat at Lake Lowell Unit to benefit key migrating birds including sage thrashers, loggerhead shrikes, burrowing owls, and other species.
- Maintain and enhance all Refuge islands through seasonal closures and habitat management.
- Maintain grain and forage crops on 250 acres to benefit migratory ducks and geese and other resident wildlife.

- Inventory and map noxious weeds and prioritize treatment with a variety of tools including mechanical removal, herbicide use, and prescribed fire, consistent with the Integrated Pest Management Plan (Appendix G).

Management of Public Uses

The Refuge provides access for a wide range of outdoor recreational activities while putting in place measures (e.g., no-wake zones and seasonal closures) to protect wildlife. Management efforts will focus on increasing participation in all six, priority wildlife-dependent recreational activities. Fishing and interpretation will be emphasized to serve a growing diverse, urban population. Management of public uses will connect people with nature and build support for wildlife conservation.

Deer Flat Refuge will be one of the few, if not only, refuges in the NWRS that allows use of personal watercraft, waterskiing, wakeboarding, kiteboarding, and windsurfing in waters under Service jurisdiction. It is anticipated that participants in these activities will be exposed to interpretive messages that encourage appropriate, conservation-oriented visitor behavior to benefit wildlife.

Our management direction includes several elements to protect wildlife and enhance recreational experiences at the Refuge. These include:

- **Lower Dam Recreation Area facilities.** A visitor contact station and a fishing and observation dock/platform will be provided at the Lower Dam Recreation Area. Suitability will be assessed for providing a 0.65-mile interpretive loop trail in riparian habitat between the Lower Dam Recreation Area and Murphy's Neck, which will be accessible for visitors with mobility impairments in compliance with the Architectural Barriers Act (ABA).
- **Gotts Point** will be opened to vehicular traffic upon completion of a cooperative agreement with Canyon County for increased law enforcement presence. Other potential improvements such as electronic gates and improved lighting might also be implemented. Access to the water's edge will be improved for visitors with mobility impairments.
- **Environmental education and interpretive programs** will continue. Emphasis will be placed on developing interpretive programs, with the goal of increasing visitor awareness of the Refuge's purposes and goals and to encourage appropriate, conservation-oriented visitor behavior. On-site interpretation will involve updating visitor center displays, installing additional interpretive signage, and providing more interpretive tours. Public contact with Refuge staff and volunteers will significantly increase. EE will continue and the program will emphasize on-site and teacher-led programs.
- **Upland, waterfowl, and deer hunt areas** will be maintained. Each waterfowl hunter will have a limit of 25 shotgun shells.
- **Wildlife-dependent activities** such as fishing, wildlife observation, and photography will be allowed on-trail year-round and off-trail all year in the East Side Recreation Area, and off-trail seasonally in the South Side and North Side Recreation Areas. Shoreline access will be developed at Parking Lots 2, 3, 4, and 7. Ice fishing will be allowed within 200 yards of the dams, subject to areas posted by Reclamation.
- **Horseback riding, bicycling, and other nonwildlife-dependent activities** will be allowed on designated trails only (Maps 4-6). Narrower trails and those used by EE groups will be designated for pedestrian use only. As described in Section 2.2.1.1, ice skating and land-based competitive group activities will not be allowed.
- **On-leash dog walking** will be allowed on designated trails (see Maps 4-6), and in the Refuge's Lower Dam Recreation Area.

- **Wake-causing activities** will be allowed in the East and West Pools, outside of the no-wake zones and seasonal closures, from April 15 through September 30. Generally, wakes occur when boats travel at speeds greater than 5 mph.
- **Boardwalk.** A feasibility assessment will be completed to determine whether trail access between Parking Lots 1 and 3 could be provided at a reasonable cost. Other fishing docks will be provided as shown on Map 4.
- **Swimming.** To increase swimming safety and reduce impacts to anglers, swimmers will be encouraged to swim in the designated swimming areas at the Upper and Lower Dams.

Limiting Ice Activity

Safety is a major concern for recreational users that rely on the structural integrity of ice on Lake Lowell to enjoy ice activities. Systematic ice evaluations by qualified personnel are not conducted on Lake Lowell, and average monthly high temperatures in Treasure Valley do not reach freezing according to the National Weather Service (www.rssweather.com/climate/Idaho/Boise/). This, combined with high winds and long fetch, makes the freezing of Lake Lowell unpredictable, and any frozen areas potentially unsafe.

Lake Lowell is closed to boating from October 1 through April 14 to provide habitat for wintering waterfowl and reduce disturbance from human-caused flushing events. Under the management direction in this CCP, the lake will be open to ice fishing but closed to all other human access during those months, including ice skating and cross-country skiing. We addressed ice skating in a Finding of Appropriateness in Appendix A, and in our response to comments in Appendix H.

Limiting Organized Group Activities

Wildlife-dependent group activities (e.g., fishing tournaments) may be allowed by an SUP that limits the number of participants, times of use, and areas of use to reduce impacts to other wildlife-dependent recreationists.

Land-based nonwildlife-dependent competitive events and group training for competitive events (e.g., cross-country training and meets) will not be allowed because they exclude the general public, increase wildlife disturbance, affect the quality of wildlife-dependent activities, require additional management resources, and increase safety concerns. See also the Competitive Jogging, Competitive Cycling, and Competitive Rowing Appropriate Use Determinations in Appendix A.

Sailing regattas will be allowed according to the stipulations set forth in the Compatibility Determination for Sailing Regattas in Appendix B.

Nonwildlife-dependent group events (e.g., weddings, reunions, birthday parties, and other gatherings) will be allowed only at the Lower Dam Recreation Area because of the availability of parking, restrooms, picnic areas, and trash services. Such group events will be required to comply with stipulations laid out in the Compatibility Determination for Swimming, Beach Use, and Picnicking (Appendix B), to reduce impacts to visitor safety or the ability of other visitors to enjoy the Refuge. These stipulations will be provided to visitors on the Refuge website and through handouts. If staffing and funding levels allow at a later time, organized group events may be required to obtain an SUP and a fee may be assessed for the SUP.

Improving Safety and Traffic Flow

A transportation study for the Lower Dam Recreation Area and the east Upper Dam boat launch will identify site planning, signs, and other mechanisms to reduce congestion and provide parking availability information to allow people to detour to other launches when a parking lot is full. To increase pedestrian safety near the east Upper Dam boat launch, the Refuge will work with the County Highway District to identify and install safety features such as crosswalks between the Refuge and the County Park. The on-Refuge parking areas along Iowa Avenue will be removed or blocked, because there is no designated access to the lake at those locations, and pedestrian safety has been a concern. Parking at Lot 7 will be restricted to the parking area, and will not be allowed between the parking area and the lakeshore in order to provide access for visitors launching boats.

Working with Board of Control and Bureau of Reclamation on Reservoir Water Level Prescriptions and Shared Efficiencies

Deer Flat Reservoir (renamed Lake Lowell in 1948) was built as part of Reclamation's Boise-Payette Project between 1906 and 1908. Providing irrigation to the surrounding lands was the project's sole purpose at its inception. Although the Refuge's primary purpose is to "provide a refuge and breeding ground for migratory birds and other wildlife," the Refuge may not impede the purpose of the reservoir for irrigation. The irrigation purpose puts the administrative responsibility for water level management with Reclamation and the Board of Control.

Reservoir water level declines throughout the irrigation season (April to September) when irrigation outflow exceeds water inflow from the New York Canal. This results in fairly low water levels in the lake in July and August. Using data acquired from the Lake Lowell Hydromet Station (www.usbr.gov/pn/hydromet/dfcgi.html), the average water level elevation was estimated to range from 2,520 to 2,516 feet during this time period. Many species, both plant and animal, can adapt and/or use habitat where water levels fluctuate, and sometimes even benefit from the changes. For example, low water levels in Lake Lowell in mid- to late-July expose mudflats that provide foraging habitat for migrating shorebirds. However, when water levels drop too low in June and early July, emergent plant beds can dry out, and grebe and other on-water nests can be left on dry land. If that happens, the adults will often abandon the colony, or the nests will be destroyed by predators.

Because the Board of Control, in cooperation with Reclamation, manages the water level, Refuge staff will continue to explore with the Board of Control the possibility of maintaining a water level appropriate to provide nesting and foraging habitat for grebes, fish, and other wildlife from April through July, while still meeting the Board of Control's mission of providing water to irrigators. Based on 2010-2011 nesting surveys, the appropriate water level will be at or above an elevation of approximately 2,520 feet. However, Refuge staff will continue to monitor waterbird nesting to determine appropriate target water levels. In addition, the Refuge will explore with the Board of Control the possibility of dropping the water level to at or below approximately 2,515 feet by September 1 to provide mudflats for foraging shorebirds while still meeting their irrigation mission.

Refuge staff will also work with the Board of Control's staff to coordinate water conservation educational projects that will assist with meeting both agencies' purposes and missions.

Working with Partners to Improve Lake Lowell's Water Quality

Lake Lowell has significant water quality problems that affect both wildlife and recreationists. The Federal Clean Water Act (CWA; 33 U.S.C. 1251 et seq.) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to Section 303 of the CWA, are to adopt water-quality standards necessary to protect fish, shellfish, and wildlife, while providing recreation in and on the nation's waters whenever possible.

Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water-quality standards). Lake Lowell is on this list. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants that is set at a level expected to achieve water quality standards. The Idaho Department of Environmental Quality (IDEQ) published the final TMDL for pollutants in Lake Lowell in 2010 (IDEQ 2010).

Lake Lowell's water quality problems have been developing for approximately 100 years and will take considerable time and money to improve. The Refuge is very concerned about water quality impacts on both wildlife and Refuge visitors and plans to be an active partner in working toward improving the lake's water quality. Several strategies are included in this CCP, they follow.

- Work toward reducing the carp population (Objective 2.3.1.1).
- Conduct water-quality monitoring to aid in evaluating the current TMDL (Objective 2.3.6.3).
- Promote the use of CARB star-rated motors at two-star ratings and above (Objective 2.4.1.4).
- Develop a water quality education program (Objective 2.4.4.1).
- Form a working group to investigate water-quality improvement actions (Objective 2.4.6.2).
- Work closely with the Board of Control to implement best management practices to reduce sediment runoff as well as evaluate current canal maintenance practices and identify areas for improvement (e.g., planting, geowebbing, contouring; Objective 2.4.6.2).
- Attend applicable water quality meetings with IDEQ and the Lower Boise Watershed Advisory Group to develop partnerships, increase knowledge, and leverage resources (Objective 2.4.6.2).

Siltation of the lake may also be an issue in the future. Areas that are currently used for nesting and angling appear to be silting in, which will eventually make them unusable for these activities. There is currently no plan to reduce future siltation or correct the current siltation issues. The Refuge will work with the Board of Control and Reclamation to identify ways to reduce siltation and correct current siltation issues without damaging wildlife habitat or impeding the delivery of irrigation water.

2.2.1.2 Snake River Islands Unit

Management of Wildlife and Habitat

Refuge staff will emphasize management of the Snake River Islands Unit by increasing wildlife inventory and monitoring efforts and increasing invasive species control (following the IPM Plan in Appendix G) and restoration efforts. The islands' management will be prioritized using several factors and managed accordingly. The most biologically intact islands will receive higher management priority (Objective 2.3.2.2). Island closure dates will be adjusted to better protect nesting geese, wading birds, gulls, and terns. An array of management techniques may be used, including prescribed fire and aerial application of herbicide and/or seed.

Management of Public Uses

Existing public uses will continue and will include wildlife observation, and deer, upland, and waterfowl hunting on 1,219 acres. Most of the Snake River Islands Unit will be open for off-trail, free-roam activities, including shoreline fishing, from June 15 through January 31. Heron- and gull-nesting islands (four-six islands) will be open for off-trail, free-roam activities from July 1 through January 31.

2.2.2 Management Actions Applicable to Both Refuge Units

Adaptive Management

Adaptive management is an approach to resource management that emphasizes adjusting management practices in response to what has been learned. Based on 522 DM 1 (Adaptive Management Implementation Policy), the Service will use adaptive management for conserving, protecting and, where appropriate, restoring lands and resources. Within 43 C.F.R. 46.30, adaptive management is defined as a system of management practices based on clearly identified outcomes, where monitoring evaluates whether management actions are achieving desired results (objectives). Adaptive management decisions are based on the best available science, common sense, experience, experimentation, new scientific discoveries, and monitoring.

The recently published *Department of the Interior Adaptive Management Technical Guide* (http://www.doi.gov/initiatives/AdaptiveManagement/index.html) also defines adaptive management as a decision process that "promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood." Adaptive management accounts for the fact that complete knowledge about fish, wildlife, plants, habitats, and the ecological processes supporting them may be lacking. The role of natural variability contributing to ecological resilience also is recognized as an important principle for adaptive management. It is not a trial and error process; instead, adaptive management emphasizes learning while doing. It is based on available scientific information and the best professional judgment of Refuge staff while considering site-specific biotic and abiotic factors on the Refuge.

Assessing and Monitoring Effects of Climate Trends and Climate Change

As stated in the Department of the Interior's Secretarial Order 3226 and the Service's Climate Change Strategic Plan, the Service considers and analyzes climate change in its decisions, long-range plans, and other activities. Habitat conditions and wildlife populations are directly and indirectly sensitive to climatic conditions, namely precipitation, temperature, and changes to hydrologic conditions. As described in greater detail in Chapter 3, the subbasin's hydrology is particularly sensitive to changes in climate because snowmelt dominates seasonal runoff and the rain/snow balance is sensitive to temperature.

Combined changes to temperature, precipitation, and hydrology can affect the Refuge's habitats and species directly, such as the timing of migratory arrival of birds, many other phenologic responses, and changes in species' ranges and physiology. These combined changes can also affect species indirectly, such as added vulnerability to other stressors (including increasing invasive species and pathogens). These indirect effects highlight the importance of monitoring habitats and species to establish potential correlations and adaptation options.

Knowledge and monitoring of regional and local climate trends on Refuge resources will be used to assess potential changes or enhancements to the Refuge's management actions and techniques and/or their timing, using the adaptive management approach described below.

The Refuge will monitor wildlife corridor analyses, vulnerability assessments, and other efforts, including those underway at a landscape scale, such as the Great Northern Landscape Conservation Cooperative (LCC). LCCs are formal science-management partnerships between the Service, Federal agencies, States, Tribes, nongovernmental organizations, universities, and other entities to address climate change and other biological stressors in an integrated fashion. LCCs provide science support, biological planning, conservation design, research, and design of inventory and monitoring programs.

Biological Integrity

The Refuge Administration Act directs the Service to "ensure that the biological integrity, diversity, and environmental health of the [NWRS] are maintained for the benefit of present and future generations of Americans." The policy is an additional directive for the Service to follow while achieving the Refuge's purposes and the NWRS mission. It provides for consideration and protection of the broad spectrum of native fish, wildlife, and habitat resources found on the Deer Flat Refuge.

When evaluating the appropriate management direction for the Refuge (e.g., in compatibility determinations), we used sound professional judgment to determine the Refuge's contribution to biological integrity, diversity, and environmental health at multiple landscape scales. We incorporated field experience, our knowledge of Refuge resources, an understanding of the Refuge's role within the ecosystem, and applicable laws and the best available science, including consultation with others both inside and outside the Service.

Cultural Resource Protection and Section 106 Compliance

Actions that may affect cultural resources will be reviewed by the Regional Archaeologist. Those undertakings that are found to have the potential to affect cultural resources will undergo further examination and evaluation, under Section 106 of the National Historic Preservation Act (NHPA), dependent on the nature and extent of the effect.

Feral and/or Nuisance Animal Control

The close proximity of Deer Flat NWR to a city lends itself to the reality of feral animals running at large on Refuge property. The extent of feral animal use and presence within Refuge boundaries and the amount of impact on trust resources has not been formally studied and is currently unknown. However, sighting of feral animals on Deer Flat NWR is a common occurrence by visitors, staff, and volunteers. Incidents of dumping unwanted pets onto the Refuge are also common.

During the life of this CCP, we will address the feral animal issue including assessing impacts to resources and appropriate measures of control that could produce positive results including:

- Reducing damages to Refuge resources and facilities;
- Protecting humans, wildlife, and domestic animals from diseases carried by pest species;
- Preventing damages to adjacent private landowners property;
- Controlling exotic and/or feral species so that native wildlife species can thrive; and
- Protecting quality wildlife-oriented recreational experiences for the public.

Outside of assessments and studies on the impacts of feral animals, dogs and cats will be dealt with on the Refuge as authorized by 50 C.F.R. 28.43, Destruction of Dogs and Cats: "Dogs and cats running at large on a national wildlife refuge and observed by an authorized official in the act of killing, injuring, harassing or molesting humans or wildlife may be disposed of in the interest of public safety and protection of the wildlife."

Fire Management

Fire management activities will conform to guidelines contained in Service policy and an approved fire management plan for the Refuge. The Refuge's current fire management plan is in Appendix K.

Invasive Species Control and Integrated Pest Management

In accordance with 517 DM 1 and 569 FW 1, an integrated pest management (IPM) approach will be used, where practicable, to eradicate, control, or contain pest and invasive species (herein collectively referred to as *pests*) on Refuge lands. IPM will involve using methods based upon effectiveness, cost, and minimal ecological disruption, which considers minimum potential effects to nontarget species and the Refuge environment.

Pesticides may be used where physical, cultural, and biological methods or combinations thereof, are impractical or incapable of providing adequate control, eradication, or containment. If a pesticide is needed on Refuge lands, the most specific (selective) chemical available for the target species will be used unless considerations of persistence or other environmental and/or biotic hazards will preclude it. In accordance with 517 DM 1, pesticide usage will be further restricted because only pesticides registered with the U.S. Environmental Protection Agency (EPA) in full compliance with the Federal Insecticide, Fungicide, and Rodenticide Act and as provided in regulations, orders, or permits issued by EPA may be applied on lands and waters under Refuge jurisdiction.

Environmental harm by pest species refers to a biologically substantial decrease in environmental quality as indicated by a variety of potential factors including declines in native species populations or communities, degraded habitat quality or long-term habitat loss, and/or altered ecological processes. Environmental harm may be a result of direct effects of pests on native species including preying and feeding on them; causing or vectoring diseases; preventing them from reproducing or killing their young; out-competing them for food, nutrients, light, nest sites, or other vital resources; or hybridizing with them so frequently that within a few generations, few if any truly native individuals remain. Environmental harm also can be the result of an indirect effect of pest species. For example, decreased waterfowl use may result from invasive plant infestations reducing the availability and/or abundance of native wetland plants that provide forage during the winter.

Environmental harm may involve detrimental changes in ecological processes. For example, cheatgrass infestations in shrub-steppe habitat greatly can alter fire return intervals, displacing native species and communities of bunchgrasses, forbs, and shrubs. Environmental harm may also cause or be associated with economic losses and damage to human, plant, and animal health. For example, invasions by fire-promoting grasses, which alter entire plant and animal communities and eliminate or sharply reduce populations of many native plant and animal species, can also greatly increase firefighting costs.

See Appendix G for the Refuge's IPM program documentation to manage pests for this CCP. Along with a more detailed discussion of IPM techniques, this documentation describes the selective use of

pesticides for pest management on Refuge lands, where necessary. Throughout the life of the CCP, pesticide uses on Refuge lands will be evaluated for potential effects to Refuge biological resources and environmental quality prior to use. These potential effects will be documented in Chemical Profiles (see Appendix G).

Pesticide uses with appropriate and practical best management practices (BMPs) for habitat management as well as cropland/facilities maintenance will be approved for use on Refuge lands where there likely will be only minor, temporary, and localized effects to species and environmental quality based upon non-exceedance of threshold values in Chemical Profiles. However, pesticides may be used on Refuge lands where substantial effects to species and the environment are possible (i.e., effects exceed threshold values) in order to protect human health and safety (e.g., mosquito-borne disease).

Maintaining and Updating Existing Facilities

Periodic maintenance and updating of Refuge buildings and facilities will be necessary. Periodic updating of facilities is necessary for safety and accessibility, to reduce the Refuge's carbon footprint, and to support staff and management needs. When existing facilities are modified or new facilities and programs developed, the Refuge will use principles of universal design to make facilities usable by all people to the greatest extent possible, without separate or segregated access for people with mobility impairments.

Monitoring Effects of Public Use Programs on Wildlife

Staff will monitor the effects of public use on wildlife and consider modifications to the location, timing, and/or type of public use if disturbance to wildlife or habitat degradation reaches unacceptable levels.

Monitoring Quality of Public Use Programs

Visitor use surveys will assess the quality of the fishing, hunting, environmental education, interpretation, wildlife observation, and photography programs. Quality for priority wildlife-dependent uses is defined in Refuge policy by several elements (605 FW 1):

- Promotes safety of participants, other visitors, and facilities;
- Promotes responsible behaviors and compliance with applicable laws and regulations;
- Minimizes or eliminates conflicts with fish and wildlife population or habitat goals or objectives;
- Minimizes or eliminates conflict with other users;
- Minimizes conflicts with neighboring landowners;
- Promotes accessibility and availability to a broad spectrum of the public;
- Promotes resources stewardship and conservation;
- Promotes public understanding and increases public appreciation of natural resources and the Refuge's and National Wildlife Refuge System's role in managing and protecting these resources;
- Provides reliable/reasonable opportunities to experience wildlife;
- Uses facilities that are accessible and blend into the natural setting; and
- Uses visitor satisfaction to help define and evaluate programs.

Mosquito Abatement

Mosquito control activities began on the Refuge in 2000 to prevent the spread of western equine encephalitis and West Nile virus. Mosquito monitoring (primarily *Culex* species) begins in mid-April with weekly sampling on the Refuge. Treatments typically begin in early May and continue until September with the first frost. The larvicide *Bacillus thuringiensis israelensis* (Bti) is used on the Refuge and applied by the Canyon County Mosquito Abatement District using several methods: backpack sprayer, hydraulic-powered spray equipment, and aerially in accordance with a Special Use Permit (SUP) issued annually by the Refuge (see the Compatibility Determination for Mosquito Management in Appendix B). Aerial application began in 2004 to reduce wildlife disturbance from ground applications.

Response to Mosquito-Borne Diseases

Mosquito populations on Refuge lands will be allowed to fluctuate and function unimpeded unless they pose a threat to wildlife and/or human health. We recognize mosquitoes are native invertebrates inhabiting aquatic habitats which provide forage for fish and wildlife including migratory birds.

To protect human and wildlife health and safety, the State or local vector control agency will be allowed to control mosquito populations on refuge lands. Pesticide treatments (larvicides, pupacides, or adulticides) will be allowed on Refuge lands only if local, current population monitoring and/or disease surveillance data indicate Refuge-based mosquitoes pose a health threat to humans and/or wildlife. As previously described, mosquito treatments will be allowed on Refuge lands in accordance with IPM principles applicable to all pests (see Appendix G). Pesticide uses for mosquito control will include appropriate and practical BMPs where possible, given potential effects documented in Chemical Profiles.

After approval of the CCP, a disease contingency plan will be prepared addressing response to mosquito-borne disease outbreaks on and/or adjacent to Refuge lands. The disease contingency plan will also include other information such as the history of mosquito-borne diseases on and/or adjacent to the Refuge as well as measures to protect Refuge visitors, Service-authorized agents, and Service employees when a health threat or emergency is identified by health officials.

Participation in Planning and Review of Regional Development Activities

The Service will actively participate in planning and studies pertaining to development, transportation, recreation, contamination, and other potential concerns that may affect Refuge resources. The Service will continue to cultivate working relationships with County, State, and Federal agencies to stay abreast of current and potential developments and will use outreach and education as needed to raise awareness of Refuge resources and their dependence on the local environment.

Reductions in the Refuge's Carbon Footprint

The Service developed the Strategic Plan for Responding to Accelerating Climate Change in the 21st Century (2009) and a 5-year action plan outlining specific actions needed to implement the strategic plan. The action plan calls for the Service to make its operations carbon-neutral by 2020. The Refuge will work toward this goal by replacing its current vehicles with more fuel-efficient vehicles and by building appropriately sized, energy-efficient facilities, as funding becomes available. The Refuge

will also reduce the carbon footprint of land management activities by using energy-efficient techniques where feasible and in line with management goals. The Refuge will also explore ways of offsetting any remaining carbon balance, such as carbon sequestration.

Research

Research projects will be allowed on the Refuge in accordance with Service policy and SUP provisions. Researchers focusing on high-priority Refuge research projects will be given enhanced consideration. See the Compatibility Determination for Research in Appendix B for further details.

State Coordination

The Service will continue to maintain regular discussions with the IDFG and ODFW. Key topics of discussion include management of Canada geese and other waterfowl, depredation, wildlife monitoring, hunting, and fishing seasons and regulations, and management of species listed at the Federal and State levels. The Refuge will continue to coordinate with IDFG on the stocking of the following fish species at the Lake Lowell Unit: largemouth bass, smallmouth bass, bluegill, channel catfish, black crappie, yellow perch, rainbow trout, and Lahontan cutthroat trout. Stocking of any other fish species will require additional planning. The Refuge is committed to developing a cooperative agreement with IDFG for resident fish and wildlife management.

Step-down Management Plans

The Refuge will complete step-down plans to provide additional detail for habitat management, visitor services management, fisheries management, and the inventory and monitoring program within five years of implementation of the CCP. Hunt plans will also be created for any newly proposed hunts or for expansion of any existing hunts.

Tribal Consultation and Coordination

All appropriate and necessary consultation with Tribes will be undertaken prior to implementing any action. Two Executive Orders (E.O. 13007, Sacred Sites; and E.O. 13175, Tribal Consultation and Coordination); as well as the NHPA, NEPA, and Archaeological Resources Protection Act (ARPA), have specific references for fulfilling coordination and consultation requirements.

Urban Refuge

With its close proximity to the cities of Nampa, Caldwell, and Boise, and as the surrounding area is developed, Deer Flat NWR has become an increasingly urban refuge. Between 1990 and 2010, the population of Canyon County doubled, from 90,000 to over 180,000 (U.S. Census 2012a). Because of its proximity to a large urban area, the potential for the Refuge to connect urban dwellers to nature—and thereby build support for the Refuge System mission—is high.

Volunteer Opportunities and Partnerships

Volunteer opportunities and partnerships are key components of the successful management of public lands and are vital to Refuge programs, plans, and projects, especially in times of static or declining budgets. Currently the Refuge makes use of volunteers in invasive species control, habitat restoration, maintenance, visitor surveys, and public use programs. In the future, successful

implementation of native habitat restoration, survey, and monitoring activities, and environmental education (EE) and interpretation programs will require the use of partnerships and volunteers.

Wilderness Review

Service CCP policy requires that a wilderness review be completed for all CCPs. If it is determined that the potential for wilderness designation is found, the process moves on to the wilderness study phase. As part of the process for this Final CCP/EIS, the planning team completed a wilderness review that can be found in Appendix D. This review concluded that Refuge lands are not suitable for wilderness designation.

Assess Feasibility of Fees

A feasibility assessment will be conducted to evaluate whether to charge an entrance and/or boat launch fee to provide funding to maintain visitor facilities and hire visitor services and law enforcement staff. Criteria to consider will include impacts to the community, the cost-benefit ratio of charging and collecting a fee, and other relevant factors.

Conduct Community Outreach

To increase community awareness, support, and appreciation for the Refuge and its purpose, the Refuge will conduct outreach with off-site audiences focusing particularly on adjacent landowners, local municipalities, and local community groups, because they have high potential to deliver Refuge messages to key audiences. Outreach programs will cover the same themes as those eventually identified for environmental education (EE) (see Objective 2.4.4.1) as well as basic information about Refuge programs (e.g., hunting regulations).

Enhance Law Enforcement

The law enforcement program will be enhanced to increase compliance with Refuge regulations and decrease trespass and vandalism. Methods may include hiring an officer and adding lighting, automatic gates, and security cameras.

Expand Hunting

Opportunities for hunting of additional species (e.g., turkey) will be addressed in future step-down planning efforts occurring in close coordination with IDFG. This process will require additional information provided in a hunt plan and an individual NEPA analysis. Changes to current hunting opportunities can be found in Section 2.4.2.

Improve Hunting Safety

Hunting and nonhunting areas will be clearly marked with signs on land and water, to notify nonhunters of hunt area boundaries and to notify waterfowl hunters when they reach the end of a hunt zone. Signs will be erected on the Refuge boundary to remind upland hunters not to shoot across or toward the boundary to reduce the potential for shot to travel onto private lands and public roads.

Promote Refuge-friendly Land Use with Neighbors and Local Municipalities

From aerial images of the Refuge, it is readily apparent that the Refuge is an island surrounded by human alterations of the landscape. It is bounded by agricultural fields, but even this landscape has been rapidly changing. The small cities and communities that dot the landscape around the Refuge have experienced one of the highest growth rates in the country. Because the Refuge represents only a small part of the overall landscape, to successfully manage wildlife the Service must work with other agencies, governments, businesses, and neighboring landowners to protect and preserve Refuge wildlife and wildlife habitat.

The Refuge also plans to conduct outreach to adjacent landowners to educate them about their potential impacts (fragmentation, feral animals, habitat degradation) to wildlife and habitat and to promote awareness of existing incentive programs that promote continued agricultural use and/or low-density development. Cooperation and education of Refuge neighbors could also enhance the law enforcement program by providing a well-educated corps of neighboring landowners and regular Refuge visitors who may observe and report inappropriate or illicit behavior on the Refuge. This could reduce the number of violators through increased surveillance, thus benefitting natural and cultural resources, taxpayers' investment in visitor facilities, and visitor experiences.

Table 2-1. Summary of Management Direction by Issue

Issue	Management Direction
	How will the Refuge protect its valuable resources on the Lake Lowell Unit?
Recreational boating	Expand the no-wake zone to the east of a line between Parking Lot 1 and Gotts Point and at the Narrows. Add no-wake zone 200 yards from the edge of the vegetation between Parking Lots 1 and 8.
Boating season	Open lake April 15 through September 30.
Protection of emergent beds	Keep all emergent beds open to public use, except up to a 500-yard closure around active and historical grebe nesting colonies during the boating season. Keep closure in place until July 15 of the following year.
Protection of mudflats	Seasonally close mudflats when water levels below 2,522 feet around shorebird areas in the East and West Pools.
Creation of mudflats	Remove 5 to 25 acres of shoreline vegetation adjacent to West Pool mudflats.
Noise	Enforce State/County decibel limits.
Swimming	Encourage swimmers to swim at designated swimming areas at the Lower Dam Recreation Area and Upper Dam, and allow swimming at other areas.
Upland access	Allow wildlife-dependent activities off-trail at—East Side Recreation Area year-round; Gotts Point February 1 through September 30; and in all other open areas August 1 through January 31. Allow nonwildlife-dependent activities on designated trails only.
Upland activities	Allow walking, jogging, bicycling, horseback riding, and on-leash dog walking.
	How will the Refuge protect its valuable resources on the Snake River Islands Unit?
Nesting protection	Most Refuge islands will be open to public use outside of goose nesting season from June 15 through January 31. Some Refuge islands (currently four to six) will be open to public use July 1 through January 31 to reduce disturbance to nesting herons, gulls, and terns.
	How will the Refuge provide safe, accessible, high quality compatible wildlife-dependent recreation opportunities in the future?
Wildlife observation and photography	Maintain existing and add additional trails and observation facilities (see Maps 4-6).
Environmental education (EE) and interpretation	Increase interpretive opportunities and programs. Reduce the size of current EE program by emphasizing on-site programs.
	Redesign Lower Dam Recreation Area (LDRA) to include new facilities and trails.

Issue	Management Direction
Upland game hunting	Allow upland game hunting at Snake River Islands Unit. Allow upland game bird hunting at Lake Lowell Unit between Parking Lots 1 and 8, and from the east boundary of Gotts Point to the east boundary of the Leavitt Tract.
Waterfowl hunting	Allow on Snake River Islands Unit. Allow on Lake Lowell Unit between Parking Lots 1 and 8, and from the east boundary of Gotts Point to the east boundary of the Leavitt Tract.
Shell limit	A limit of 25 shotgun shells in possession per hunter will be implemented.
Type of hunt	Offer general season hunt.
Youth hunt	Allow youth hunt in all designated waterfowl hunting zones.
Deer hunting	Allow on Snake River Islands Unit, and allow controlled hunt on Lake Lowell Unit from Parking Lot 8 to the New York Canal.
Fishing	Provide additional shoreline fishing access from designated trails and docks (see Maps 4-6). Allow access in all open areas of lake. Allow anglers off-trail in East Side Recreation Area year-round, at Gotts Point February 1 through September 30, at Murphy's Neck March 15 to September 30, and in all other open areas August 1 through January 31. From October 1 to April 14 fishing is allowed from nonmotorized boats in Fishing Areas A and B. Allow ice fishing within 200 yards of the dams, subject to areas posted by Reclamation.
Fees	Evaluate whether to charge an entrance and/or boat launch fee.
Bass Tournaments	Allow every other weekend from LDRA, April 15 through May 13 and July 10 through September 30.
Gotts Point Access	Allow vehicle access (contingent on signed agreement with County Sheriff to reduce illegal activities).

2.3 Wildlife and Habitat Goals, Objectives, and Strategies

Goals and objectives are the unifying elements of successful refuge management. They identify and focus management priorities, resolve issues, and link to refuge purposes, Service policy, and the NWRS mission.

A CCP describes management actions that help bring a refuge closer to its vision. A vision broadly reflects the Refuge's purposes, the Refuge System mission and goals, other statutory requirements, and larger-scale plans as appropriate. Goals then define general targets in support of the vision, followed by objectives that direct effort into incremental and measurable steps toward achieving those goals. Strategies identify specific tools and actions to accomplish objectives (USFWS 2002a).

The goals for Deer Flat NWR for the next 15 years are presented in the following tables. The order of the goals does **not** imply any priority in this CCP. Priority actions are identified in the staffing and funding analysis (see Appendix C). Each goal is followed by the objectives that pertain to it. Some objectives pertain to multiple goals and have simply been placed in the most reasonable spot. Below each objective statement are the strategies that could be employed to accomplish the objective. Some strategies pertain to multiple objectives. Symbols are used in the tables with the following meanings:

%	percent
>	greater than
<	less than
≥	greater than or equal to
≤	less than or equal to

2.3.1 Goal 1 (Lake): Protect, maintain, and enhance mudflat, emergent-bed and open-water habitats associated with Lake Lowell to benefit migratory birds and other wildlife

Objective 2.3.1.1. Protect, maintain, and enhance emergent beds – Lake Lowell shoreline
Protect 845, maintain 100, and enhance 250 acres of emergent plant beds on Lake Lowell, benefiting aquatic migratory birds (e.g., western and Clark's grebes, great egrets, and mallards) and other fish and wildlife. These emergent plant beds are characterized by the following attributes: • 50%-70% cover of desirable moist-soil plants (e.g., smartweeds, spikerushes, salt grass) interspersed with taller (<3 feet) emergent plants (e.g., bulrush, simplestem bur-reed, and cattail) • Presence of native/desirable submergent plants (e.g., pondweeds) • No hydrilla, Eurasian watermilfoil, or purple loosestrife present • Areas with high concentrations of breeding and foraging birds and other wildlife protected from human-caused disturbance • Minimum water elevation of 2,520 feet to benefit grebe nesting colonies from April through July (if suitable for Board of Control)
Strategies Applied to Achieve Objective
Implement boating closures to protect emergent beds for grebe nesting and other wildlife. See Objective 2.4.1.4. On a seasonal basis, close areas critical to nesting birds (e.g., grebe colonies, heron rookeries, and bald eagle nests) from public entry. Size these areas appropriately according to best available science. Keep the areas closed until no nesting is observed in the same area the following year.
Work with IDFG and other partners to develop and implement methods to reduce carp biomass in Lake Lowell. Potential methods include mechanical removal, chemical treatments, biological treatments, and carp exclusion devices.
Use soil disturbance (e.g., discing) techniques to create openings in emergent beds.
Seed/plant desirable moist-soil plants, as needed.
Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).
Rationale: Deer Flat NWR was established to provide a refuge and breeding grounds for migratory birds and other wildlife. The Refuge has been identified as a notable waterbird site (Ivey and Herziger 2006), an "important site for aquatic birds in Idaho" (Manning and Hartley 2006), and as a State Important Bird Area (see Chapter 1). Nineteen species of birds that use the Refuge's emergent beds, open waters, and mudflats are listed by the Idaho Comprehensive Wildlife Conservation Need Strategy (IDFG 2005) as species of greatest conservation need. These species include western and Clark's grebes, northern pintail, great egret, and hooded merganser. Emergent beds (i.e., plants that grow in the water but pierce the water surface) typically occur along the entire south and east shorelines of Lake Lowell as well as pockets along the northern shoreline. Lake Lowell's approximately 845 acres of emergent plant beds are composed predominantly of water smartweed (*Polygonum amphibium*), coyote and peachleaf willow (*Salix exigua* and *S. amygdaloides*), and bulrush (*Scirpus paludosus* and *S. tuberosus*). Plants from the *Polygonum* and *Scirpus* genera have been shown to be an important food source for ducks in the early spring (Stollberg 1950). Approximately 77 bird species in Idaho use marshes and lakes, and 55 species depend on lakes and emergent beds as their primary habitat (Idaho Partners in Flight 2000). Many of the bird species that are seen in the smartweed bed are near the edge of the open water. Nesting grebes have also selected sites near open water to facilitate easy feeding and back brooding. In order to create more edge area and open up areas for foraging and nesting waterbirds, we will explore appropriate measures to create openings (e.g., discing) and channels in the larger expanses of smartweed to facilitate grebe foraging and movement.

Smartweed was planted in the lake in 1938 by Refuge staff and typically emerges as the ambient and water temperatures increase in April and May. The plant continues to grow throughout the summer season, blooms in July, and dies back as water temperatures drop. The combination of willows, smartweed, and open water provides excellent feeding, cover, and nesting habitat for numerous species of migratory birds (including waterbirds), as well as spawning, nursery, and escape habitat for fish.

For example, marsh wrens and yellow-headed blackbirds nest in the willows, and Clark's, western, and pied-billed grebes; American coots; American bittern; and redheads, nest in the smartweed beds and also in the willows. In addition, many species use the emergent beds for foraging. Lake Lowell is known for large concentrations of wintering ducks and geese that rely on smartweed habitat. Canada geese primarily use the shallow water, smartweed beds, and other emergent cover of the lake for sanctuary and loafing during the spring. Ducks including redhead, mallard, northern shoveler, and cinnamon teal use the emergent beds as brood rearing and/or foraging habitat. Duck broods were much more common around the lake in the late 1960s than they are today.

These plants are also important to anchor soil and help reduce lakeshore erosion and sedimentation of the lake, thereby improving water quality by reducing sedimentation. Asplund (2000) concludes that naturally vegetated shoreline helps reduce the impacts of waves on shoreline erosion. The removal of some of the shoreline vegetation will be beneficial to marshland birds but may also increase or add to the erosion and sedimentation in the immediate area. The overall effects of this strategy are anticipated to be minimal as the amount of emergent vegetation removal will be small in comparison to overall size of the lake and adherence to BMPs.

According to Bouffard (1982), boat propellers can remove aquatic vegetation and change the species composition of the vegetation. Also, in Bouffard's study, vegetation loss caused as a result of bank erosion and siltation was most common in areas where waterskiing was practiced. During summer months at Lake Lowell, migratory birds such as pelicans, cormorants, and grebes loaf and forage in and adjacent to shallow water with smartweed and emergent vegetation. The presence and noise from boats and personal watercraft in and adjacent to smartweed beds and emergent vegetation (used for nesting and foraging) causes disturbance (e.g., flushing) to aquatic birds (Rodgers and Schwikert 2002).

Clark's and western grebes are migratory waterbirds that have historically used Lake Lowell for nesting, foraging and staging for migration. The breeding populations of Clark's and western grebes are listed as imperiled by the State of Idaho (IDFG 2005). Species are designated imperiled in Idaho if few populations exist, there is a rapid decline in numbers, or there are other factors that make the species vulnerable to rangewide extinction or extirpation (IDFG 2005).

Grebes at Lake Lowell nest in emergent beds, and large nesting colonies have been noted along the south shore of Lake Lowell. Although regular grebe nesting surveys have not been conducted, references to nesting grebes are made regularly in Refuge files and historical pamphlets. The shoreline and its emergent vegetation are an important habitat for a variety of wildlife, but these areas are especially important for nesting and breeding grebes in Idaho. In order to protect this habitat, the Refuge will implement various measures, including no-wake zones and seasonal boating closures to protect emergent beds that provide grebes and other waterbirds opportunities to nest, forage, and rest with minimal disturbance.

The emergent beds also provide an important buffer. Allen et al. (2008) found that such buffers are important for protecting grebe nests from wind- and/or boat-caused wakes. Boats with frequent starts, stops, and "nearplane" speeds increased the potential for habitat impacts. Increased sedimentation and/or resuspension of lake sediments, by either boating activity or natural wind events, increases turbidity and resuspends phosphorus and other pollutants that adhere to soil particles (IDEQ 2010).

Carp represent a high threat to the submerged vegetation's ecological functions. Carp uproot and eliminate submerged vegetation, increase turbidity, and decrease the abundance and diversity of the invertebrate community (Miller and Crowl 2006). The lake's carp population is estimated at 1.2 million. IDFG recommended three options for significant carp reduction: physical control such as seining, a yet-to-be-studied biological control using a koi-herpes virus, or chemical control using a rotenone treatment applied to the lake in an extreme low-water year (Kozfkay et al. 2011).

Carp removal has occurred intermittently for many years to enhance submergent vegetation and moist-soil plants in Lake Lowell. Through an SUP, a commercial fisherman uses a beach seine to harvest carp and suckers. Seining is usually conducted during the fall and winter because the fish slow down and congregate in the cooler water, making them easier to catch. Current seining operations, which remove an estimated 50 to 125 tons of biomass annually (Cunningham 2012), likely do not remove enough of the carp population (estimated at 4,800 tons of biomass) to result in significant water quality improvements or promote submergent plant growth. However, there have been no studies that have determined the appropriate threshold of biomass removal to achieve habitat improvements.

Objective 2.3.1.2. Protect, maintain, and enhance mudflats – Lake Lowell shoreline

Protect between 100 and 800 (560 based on a water level elevation of 2,515 feet), maintain 350, and enhance 560 acres of mudflats on Lake Lowell, benefitting aquatic migratory birds (e.g., shorebirds, waterfowl) and other wildlife. These mudflats are characterized by the following attributes:

- Saturated soils during mid-July to end of September
- Sparse (1%-10%) to no vegetation (e.g., moist-soil plants)
- Macroinvertebrates (e.g., chironomids) that provide forage for migratory shorebirds present
- Areas with high concentrations of foraging shorebirds, waterfowl, and other wildlife protected from human-caused disturbance, especially during the late summer and fall

Strategies Applied to Achieve Objective

Work with the Board of Control to explore lowering the water elevation to 2,515 feet by September 1.

Implement seasonal or permanent closures to prevent disturbance to migrating shorebirds. See Objective 2.4.1.4.

Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).

Rationale: Late in the summer, as Lake Lowell is drawn down for irrigation, many species of shorebirds use the exposed mudflats for feeding. Shorebirds depend upon wetland stopover sites to replenish their depleted fat reserves used during migratory flight (Farmer and Parent 1997). Many wetland areas in Idaho and throughout the United States have been drained, developed, or otherwise altered, forcing shorebirds to use other remaining wetlands. Construction of reservoirs for power and irrigation throughout the United States has created about two million acres of such habitat since the mid-1950s (Howe 1987). Taylor and Trost (1992) showed that reservoirs in the western interior can be important migratory stopover sites for shorebirds. The Lake Lowell Reservoir has been shown to be important for shorebirds.

The Intermountain West Regional Shorebird Plan (Oring et al. 2000) identified Lake Lowell as one of two sites in Idaho with greater than 5,000 shorebirds in more than half the years surveyed. The tens of thousands of shorebirds recorded at the lake document its importance as a stopover site (Taylor et al. 1992). Shorebirds present in late summer and fall include lesser and greater yellowlegs, sandpipers (western, pectoral, least, Baird's, solitary, spotted, and stilt), marbled godwits, long-billed dowitchers, plovers (black-bellied, semi-palmated, killdeer, and American golden), as well as the black-necked stilt and American avocet. If mudflats are exposed, peak shorebird abundances occur at Lake Lowell between late-July, mid-August, and mid-late September (Taylor and Trost 1992).

The Intermountain West Regional Shorebird Plan (Oring et al. 2000) lists Lake Lowell as critically important for the Wilson's phalarope, long-billed curlew, long-billed dowitcher, and black-necked stilt. Lake Lowell is also listed as very important for the western sandpiper, willet, red-necked phalarope, least sandpiper, and marbled godwit and important for the semi-palmated plover, spotted sandpiper, and greater yellowlegs. The long-billed curlew is a Federal species of special concern.

The Idaho Comprehensive Wildlife Conservation Strategy (CWCS; IDFG 2005) lists species of greatest conservation need by different levels. Three species of shorebirds that occur at Lake Lowell are included on the list; two are listed as vulnerable (black-necked stilt and American avocet), and one is listed as imperiled (marbled godwit). *Vulnerable* means the species is at moderate risk because of restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors that make it vulnerable to rangewide extinction or extirpation. *Imperiled* means the species is at risk because of restricted range, few populations (often 20 or fewer), rapidly declining numbers, or other factors that make it vulnerable to rangewide extinction or extirpation.

Studies have shown that both the date and amount of shoreline exposed affect shorebird abundance, with increasing numbers of shorebirds correlating to increasing mudflat (Taylor and Trost 1992; Turley and Holthuijzen 1999). When exposed, mudflats are the most extensive on the southeast end of the lake and near Parking Lots 1 through 3. Additional areas include areas along the north and east sides of the West Pool. At Lake Lowell, approximately 100 acres of mudflats are exposed at a surface water elevation of 2,522 feet and increase in extent to 560 acres as the water drops to typical annual lows reaching elevations of 2,515 feet. Even more mudflats are exposed if surface water elevations fall below the annual averages. If consistent mudflats are made available to shorebirds, the Refuge may experience increased numbers and prolonged stopover times, which will benefit shorebird populations and provide increasing viewing opportunity for Refuge visitors.

Deer Flat NWR does not have any jurisdiction to manage the water levels of Lake Lowell; water levels fluctuate with irrigation demands (Chapter 3). The Refuge will work with the Board of Control to explore the possibility of maintaining a minimum water level from July 15 through September 30 at or near forebay elevations ranging from 2,515 to 2,512 feet to provide mudflats for foraging shorebirds while still meeting the Board of Control's primary mission of providing water to irrigators.

The mudflats used most by shorebirds are near the New York Canal at the east end of the lake. The New York Canal is the southern boundary of the east end of the East Side Recreation Area. This area is currently open to the public for recreational activities including hunting, fishing, and wildlife observation (see Chapter 5). Recreational activities in this area could disturb migrating shorebirds.

The consequences of human disturbance, in terms of physical condition or survival, are currently unknown (Fernández et al. 2010). Some studies have shown that shorebirds avoid areas of higher disturbance. For example, when comparing bird response on paired lower and higher use days at trail sites, a study in California found the number of shorebirds decreased with increasing trail use, with higher trail-use days averaging 25 percent fewer birds than on lower use days (Trulio and Sokale 2008).

To minimize disturbances to migrating shorebirds, access to the shorebird area along the shoreline from Murphy's Neck to the Narrows and at the northern shoreline of the East Pool east of Tio Lane will be closed seasonally to boating when water level elevation falls below 2,522 feet (Objective 2.4.1.4; and Map 4). A shorebird observation blind will be installed to provide shorebird viewing opportunities while minimizing disturbance (Objective 2.4.1.3). The general and Refuge-specific effects of human-caused disturbance to wildlife are presented in Appendix B.

Objective 2.3.1.3 Create mudflats – Lake Lowell shoreline

Within five years, restore approximately 5-25 acres of mudflats at Lake Lowell adjacent to Farm Field 5 at or above approximately 2,518 feet elevation. These mudflats will provide habitat for migrating shorebirds and other wildlife when lake water levels are above 2,518 feet. These mudflats are characterized by the following attributes:

- Saturated soils during mid-July to end of September.
- Sparse (1%-10%) to no vegetation (e.g., moist-soil plants).
- Saturated soils to dry soils during mid-July to mid-September.
- Macroinvertebrates (e.g., chironomids) that provide forage for migratory shorebirds present.
- Adjacent or connected to existing mudflats with a history of high shorebird use.

Strategies Applied to Achieve Objective

Remove 5-25 acres of shoreline vegetation adjacent to current mudflats by mechanical control (including possible issuance of firewood collection permits) or controlled burn to create larger contiguous mudflats.

Create shallow scours to hold water.

Disc vegetation in late fall to incorporate organic matter into the soil and encourage invertebrate growth.

Rationale: During high-water years, Lake Lowell does not have suitable exposed mudflats to provide reliable shorebird habitat. Historically, the Refuge maintained open shorelines by removing willows and cottonwoods. According to the 1975 Refuge Annual Narrative, short willows and forbs were clipped with a tractor and rotary beater to retard succession on shoreline adjacent to Farm Field 5. In addition, firewood permits were regularly issued in the 1960s through late 1970s, which likely provided additional mudflats above and/or at elevations that are now covered by riparian habitat. These activities ceased over time, and the riparian habitat developed, as management began to shift to provide habitat for raptors.

Small openings in the riparian habitat have been maintained near Farm Field 5 and are primarily used as duck trapping sites. These areas are used by shorebirds when lake water levels are higher. The Refuge proposes to reimplement some of the historical management practices, such as willow and cottonwood removal, to provide mudflat habitat for shorebirds in high-water years. In addition, discing some of the smartweed at low water levels will incorporate organic matter into the soil and encourage invertebrate growth, therefore increasing the forage base for shorebirds even when water levels are maintained at levels conducive to providing suitable mudflats in July through September. Initially, small acreages (<5 acres) of willow and cottonwood will be removed and monitored to see if shorebirds use the area. If these first plots are used by shorebirds, then additional acreages will be treated.

Objective 2.3.1.4. Protect, maintain and enhance open-water habitat – Lake Lowell

Protect, maintain, and enhance 6,430 acres of open-water habitat (depths from 2 to 45 feet) at Lake Lowell to benefit waterfowl (e.g., mallards, geese), waterbirds (e.g., grebes, pelicans), and fish. These open-water habitats are characterized by the following attributes:

- No emergent vegetation
- Submergent plant beds in shallow areas with light penetration
- Carp no more than 20% of total fish biomass
- Areas with high concentrations of foraging and loafing birds and other wildlife protected from human-caused disturbance year-round

Strategies Applied to Achieve Objective

Implement carp reduction in 6,430 acres of open water. See Wildlife and Habitat Objective 2.3.1.1.

Continue winter waterfowl boating closure and current no-wake zones on 6,430 acres of open water. See Objective 2.4.1.4.

Implement new no-wake zones and/or closures to minimize disturbance to wildlife species that are dependent on open-water habitat. See Public Use Objective 2.4.1.4.

Work with partners to improve water quality in Lake Lowell.

Rationale: The importance of the Lake Lowell Unit to migratory birds is discussed in Objective 2.3.1.1. The lake's open-water habitat is important to many species of birds for feeding and roosting at different times of the year. Open-water sites such as Lake Lowell support large waterfowl concentrations during spring and fall staging, as well as migration and wintering (Idaho Partners in Flight 2000).

The lake carp population is estimated at 1.2 million carp (Kozfkay et al. 2011). Carp are thought to represent a high threat to the submerged vegetation's ecological functions. Carp impacts and potential treatments are discussed in Objective 2.3.1.1.

Grebes nest in the emergent beds of Lake Lowell (see Objective 2.3.1.1) and rear their young in the open water, typically from June through October. The water level drops at this time (see Objective 2.3.1.2), leaving the emergent beds dry. Lowered water levels are problematic for grebes for several reasons. Grebes eat fish and pursue them underwater (Lawrence 1950; Storer and Nuechterlein 1992) and grebe chicks are altricial (dependent on adults for protection), riding between the wings on their parent's back in open water until they are 2 to 4 weeks old. Back-brooding is essential for survival of young chicks because their plumage is not yet developed to withstand long periods of swimming and they are not adapted to loaf on shore (Storer and Nuechterlein 1992).

The fluctuating water levels on Lake Lowell have a direct effect on the amount of open water acreage available for grebes. As water levels decrease in the summer months, usable open water habitat decreases accordingly. During the 2010 and 2011 nesting season, as water levels dropped grebes moved into deeper water. Grebes nesting in the southeast portion of the lake needed to move especially far as water levels dropped, because the gradual slope of the lake bottom meant that feeding habitat was unavailable. In open water, grebes are more prone to disturbance from open-water recreational activities. High-speed boating leads to disruption of nesting and can separate chicks from adults, which may lead to a loss of production and displacement of grebes from preferred habitats (Burger 1997). Adults and chicks are often killed by boats (Ivey 2004; Shaw 1998), and small chicks can become separated from their parents and die of exposure if adults dive to avoid motorboats (Ivey 2004; Storer and Nuechterlein 1992). Creating no-wake zones will provide a sanctuary for grebes to forage and raise their young with fewer disturbances.

The open water of Lake Lowell is important for waterfowl primarily as wintering habitat, but some nesting also occurs on the Refuge. Closed areas and no-wake zones will provide undisturbed forage and brood-rearing habitat for waterfowl. Eleven species of waterfowl, including mallard, cinnamon teal, wood duck and gadwall, nest around the lake's edges and rear their young in the open water, typically in early summer. Annual Refuge narratives throughout the 1960s and early 1970s document nesting waterfowl and a fairly significant number of spring migrants using the lake. It appears that nesting and spring migration have declined over time. Reasons for the decline likely include habitat alteration (see Objective 2.3.2.1), fluctuating water levels (see Chapter 3), and disturbance. Disturbance can reduce courtship behavior and decrease egg and duckling survival. Disturbed adults may leave their eggs, nestlings, or ducklings, reducing survival rates (Korschgen and Dahlgren 1992). Impacts on waterfowl depend on the noise, speed, and proximity of watercraft (Cywinski 2004). The general and Refuge-specific effects of human-caused disturbance to wildlife are presented in Appendix B.

It is essential that grebes, waterfowl, and other wildlife can feed, roost, and raise young undisturbed on the lake. To provide places to feed, raise their young, and roost with little or no disturbance to waterfowl and waterbirds (e.g., grebes and pelicans), our strategies include seasonally closing portions of the lake to public use and implementing no-wake zones. The lake is closed to public use from October 1 through April 14 to provide resting habitat for migrating and wintering Canada geese and other waterfowl. Energy reserves are extremely important for wintering waterfowl to maintain body temperature in cold weather and provide energy for migration. Therefore, disturbance and flushing events during this critical time are more disruptive than during warmer months outside of the migration period.

2.3.2 Goal 2 (Riparian): Protect, maintain, and enhance riparian forest, benefiting migratory birds and other riparian-dependent species.

Objective 2.3.2.1. Protect, maintain, and enhance riparian forests – Lake Lowell
Protect 1,900 acres, maintain 520 acres, and enhance 1,200 acres of riparian forest communities surrounding Lake Lowell to benefit migratory birds (e.g., yellow warbler, song sparrow, herons) and a diverse assemblage of other riparian-dependent species. These riparian habitats are characterized by the following attributes: • Structurally diverse forest community • 20%-70% canopy cover of over-story woody species (e.g., cottonwood, peachleaf willow) • 30%-80% cover of native shrub in understory (e.g., willows, golden currant, wild rose, elderberry) • 25% cover of desirable/native grasses and forbs (e.g., *Deschampsia* sp., mannagrass) • 20%-40% ground cover from dead and downed wood • >2 standing dead trees/acre • 5%-25% coverage of invasive woody trees and shrubs (e.g., Russian olive) • No salt cedar • <5% cover of invasive plants (e.g., Canada thistle, perennial pepperweed, poison hemlock, reed canarygrass) • Areas with noted concentrations of nesting, wintering, and migrating birds and other wildlife protected from human-caused disturbance
Strategies Applied to Achieve Objective
Annually, remove undesirable trees, shrubs, and grass; plant desirable trees, shrubs, and grass species on 10-15 acres, as necessary.
Maintain appropriate level of downed and standing dead trees, including invasive tree and shrub species that are treated and left in place, except for the designated mudflat area adjacent to Farm Field 5.
Use mechanical and prescribed fire to reduce hazardous fuels loading, create openings, and reduce invasive species.
Maintain nesting habitat by reducing ladder fuels and/or fuel loading, or girdling trees in rookery areas and around eagle nests.
Maintain appropriate fire breaks while maintaining a continuous canopy cover.
Where feasible, relocate fire breaks to coincide with Board of Control drainage canals.
Require visitors to stay on trail seasonally to prevent disturbance to neotropical migrants, nesting wading birds, and other wildlife. See Public Use Objective 2.4.1.3.
Implement land-based seasonal closures to protect nesting and wintering areas. See Objective 2.4.1.3.
Issue SUPs for firewood collection as appropriate, to maintain level of dead and downed material.
Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).
Apply mechanical, chemical, and biological methods to treat invasive species.
Rationale: Before the construction of the reservoir, Deer Flat NWR consisted of typical sagebrush-steppe habitat that included springs and small riparian oases associated with these springs. The flooding of the reservoir eliminated the existing habitats but over the years provided an important riparian habitat. Currently, the majority of shoreline around Lake Lowell is a riparian zone dominated by cottonwood, Russian olive, coyote and peachleaf willows, and false indigo bush. The Lake Lowell Unit contains approximately 2,116 acres of riparian and/or floodplain forest habitat in various seral stages. Most of this habitat on the Refuge is in a degraded condition due to invasive plants, past grazing practices, alteration of hydrologic regimes, and potentially poor native plant recruitment/recovery.

Historically, the Refuge maintained open shorelines by removing willows and cottonwoods with a tractor and rotary beater to retard succession on shoreline in the area adjacent to Farm Field 5 (Refuge Annual Narrative 1975). In addition, firewood permits were regularly issued in the 1960s through late 1970s. Over time, these activities ceased, and a riparian habitat developed along the lakeshore. The Refuge can provide habitat for species dependent on riparian and floodplain forests by enhancing a mix of early, mid-, and late-successional riparian forests.

Human land uses (e.g., urban sprawl, agriculture) can have substantial effects on plant and animal communities, including riparian forests (Patterson and Best 1996; Wilson and Ryan 1988). One study has shown that some riparian areas harbor up to 10 times the neotropical migrants that are harbored by neighboring nonriparian habitats (Stevens et al. 1977). Of the 243 bird species breeding in Idaho, 113 (46%) use riparian habitat as nesting habitat. Many of the other 130 species also use riparian habitat as a source of water, as migratory corridors, or for other purposes. Of the 119 neotropical migratory landbirds, 68 species (57%) use riparian habitat. Many of Idaho's mammals, amphibians, reptiles, fish, and mollusks also depend on riparian habitat for survival (Idaho Partners in Flight 2000).

Wading birds, like great blue herons, typically build large stick nests in both live and dead trees in close proximity to water. Herons occasionally nest singly, but more typically they nest in large colonies that average 49 nests found in wet or dry forest, sparsely treed islands, beaver ponds, and marshes (Peck and James 1983). In order to provide this type of structure in the riparian habitat surrounding Lake Lowell, the Refuge will identify potential suitable habitats and protect and monitor them to encourage future wading bird use. Currently all recreation in the riparian habitat is required to be conducted on designated trails during the breeding season. Seasonal closures will be placed around any colonies to mitigate potential impacts from human disturbance that could result in increased mortality of chicks due to exposure or predation, nest desertion, or complete abandonment of a colony (Vos et al. 1985). The general and Refuge-specific effects of human-caused disturbance to wildlife are presented in Appendix B.

The Refuge has an opportunity to enhance riparian areas on the Lake Lowell Unit. Planting desirable species will accelerate riparian regeneration, enhance habitat quality, and provide habitat for neotropical species. Highest-priority areas for enhancement will be based on their size and location on the Refuge. Though riparian acreages are relatively small, enhancement efforts may provide valuable habitat or habitat connectivity for some species that are dependent on riparian forests. New plantings will focus on connecting or expanding existing riparian stands in areas that are likely to be used by focal species.

In areas open to public use, social trails fragment viable wildlife habitat and increase user impact on the natural system. Wildlife responds to recreationists using trails by flushing away from the perceived danger, which effectively reduces the amount of suitable habitat available to them (Taylor and Knight 2003). Frequent flushing of an animal increases the amount of expended energy, which reduces their overall growth and reproductive potential, and causes animals to avoid otherwise suitable habitat (Geist 1978). There will be seasonal restrictions on off-trail travel in some areas.

Most riparian habitat on the Refuge is in a degraded condition due to invasive plants, alteration of hydrologic regimes and poor native plant recruitment/recovery. We will focus on improving habitat conditions in the existing riparian habitat. Strategies to enhance this habitat could involve thinning and planting of young native woody species to create multi-aged stands, controlling invasive species, and establishing native understory in existing riparian forests. Selected snags, logs, and piles of woody debris will be left in place to provide important habitat for a variety of bird species and other wildlife. Passerine birds like dark-eyed juncos and white-crowned sparrows as well as upland game species like California quail use dense vegetation and brush piles for cover. Snags are used by many raptors for perching, by woodpeckers for foraging, and by wood ducks and owls for nesting. Bunnell et al. (2002) estimate that 57 percent of the listed vertebrate species in their study were reliant or associated with dead and dying

woody debris. Firewood collecting is an effective way of reducing the amount of woody debris to reduce fuel loads. In one study, an unmanaged stand consisted of 30 to 40 percent woody debris cover, which declined rapidly with successive fiber harvesting (Angelstam 1997). Care should be taken to ensure excessive harvest does not happen. A balanced approach that supports a mosaic of woody debris and open riparian forest floor will provide suitable habitat for a wide variety of wildlife.

Mechanical and prescribed fire treatments can be used to reduce the amount of fuel loading and invasive species and to restore selected sites. Removal of selected dead and downed logs can reduce the amount of fuel loading in existing riparian forests, which can reduce the likelihood of an out-of-control fire destroying riparian sanctuaries important for local and migrating wildlife. Refuge neighbors and users have expressed interest in collecting firewood from the Refuge due to its close proximity to residences and an abundance of trees and downed debris. Firewood collection could be allowed by SUP and will provide interested parties with a usable resource while benefitting the Refuge's wildlife. With the Refuge Fire Management Officer, we will identify areas vulnerable to wildfire, and place fire breaks to reduce the probability of an out-of-control wildfire destroying large swaths of riparian habitat.

Objective 2.3.2.2. Protect, maintain, and enhance riparian forests – Snake River Islands

Protect 104, maintain 104, and enhance 104 islands' riparian forest communities to benefit migratory birds (e.g., yellow warbler, song sparrow, great blue heron) and a diverse assemblage of other riparian-dependent species. Riparian habitat will be managed to meet the following attributes as appropriate:

- Structurally diverse forest community
- >20% canopy cover of over-story woody species (e.g., cottonwood, peachleaf willow)
- 30%-80% cover of native shrub in understory (e.g., golden currant, wild rose, coyote willow, elderberry)
- 25% cover of native grasses and forbs (e.g., Sandberg bluegrass, bluebunch wheatgrass)
- 20%-40% ground cover from downed trees
- >2 standing dead trees per acre
- Minimal invasive woody trees and shrubs (e.g., Russian olive, salt cedar)
- <25% cover of invasive plants (e.g., Scotch thistle)
- Areas with high concentrations of nesting and migrating birds and other wildlife protected from human-caused disturbance

Strategies Applied to Achieve Objective

Plant desirable tree and shrub species after invasive species treatment and/or removal on 2-10 islands.

Maintain downed and standing dead trees (including treated invasive tree and shrub species that are left in place) as appropriate.

Use mechanical and prescribed fire to reduce hazardous fuel loading.

Implement seasonal closures to prevent disturbance to waterfowl and colonial-nesting birds. See Public Use Objectives 2.4.1.3 and 2.4.3.1.

All Refuge islands closed from February 1 to June 14 during goose nesting season.

Some Refuge islands (currently four to six islands) closed February 1 to July 1 to reduce disturbance to colonial-nesting birds (e.g., herons, gulls, and terns).

Partner with adjacent landowners to address cattle trespass problems in targeted locations (i.e., fencing on landowner property, fencing on islands, and other exclusion methods).

Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).

Rationale: The importance of riparian habitat in the arid west is discussed in the rationale for Objective 2.3.2.1. Meador and Goldstein (2003) also suggest the universal importance of riparian zones to the maintenance and restoration of diverse fish communities in streams.

Vegetative structure varies from island to island, but most include both upland and riparian habitat. The Refuge can provide habitat for species dependent on riparian forests by enhancing or restoring a mix of early, mid-, and late-successional forests on the Snake River Islands Unit. Highest-priority areas for restoration will be based on GIS modeling that includes a ranking system identifying the most biologically intact islands that are likely to provide good habitat. Factors to be modeled include size, current condition (e.g., existing habitat, noxious weeds), neighboring land use, and isolation (measure of flow and channel depth, Zoellick et al. 2004b) (See Objective 2.3.6.4). By starting with small projects, the Refuge can monitor effectiveness, predict future funding needs, and develop a long-term strategy for enhancing riparian habitat on all of the Refuge islands.

To effectively protect riparian zones on the islands, functional partnerships with adjacent landowners will be important. Unauthorized grazing occurs on the islands periodically, especially when low water flow allows easy access. Maintaining collaborative efforts with landowners will help the Refuge identify problem areas, seek assistance for prevention of trespass, and provide a shared outlook on the importance of riparian areas on the Snake River Islands. In addition, the Refuge periodically receives requests from Snake River Islands Unit neighbors to better control invasive species to prevent spread from the islands to private property. Invasive species are an enormous problem in the Treasure Valley, especially on the Snake River Islands, and effectively reducing invasive populations can be accomplished only with a combined effort.

Fire has been used to control undesirable plant communities in the past with mixed results. The vegetative structure on some of the islands is such that mechanically thinning and then burning the entire island may be the most cost-effective method of restoration. In cooperation with Service fire personnel, Refuge staff will evaluate past, current, and future practices to effectively use fire as a valuable tool in vegetative removal and restoration of riparian zones on the Snake River Islands.

Current protection practices include the closure of Refuge islands during sensitive times, most notably nesting periods for waterfowl and wading birds. The current island closure dates are February 1 to May 31, but additional protection is warranted. Canada geese in this area generally start hatching at the end of April or beginning of May, but hatching has been noted well into June (Steele et al. 1957). Molting of flight feathers happens around the same time, and geese are more vulnerable to disturbance when they are land-bound with young. To provide protections through this vulnerable time, the island closures will be extended to June 15. The general and Refuge-specific effects of human-caused disturbance to wildlife are presented in Appendix B.

2.3.3 Goal 3 (Wetlands): Protect, maintain, and enhance nonlake wetland habitats for the benefit of migratory birds and other wildlife.

Objective 2.3.3.1. Protect, maintain, and enhance emergent wetlands

Protect 85 acres, maintain 70 acres, and enhance 85 acres of wetland on three tracts (Upper Dam Marsh, Rambo Pond, and Leavitt Tract) to benefit wetland-dependent species (e.g., wetland birds, amphibians, hydrophytic plants, aquatic invertebrates). Wetlands should be characterized by the following attributes:

- Variably flooded, from seasonal inundation (October through April) to semipermanent (October through August) to permanent
- Variable-bottom topography resulting in water depths 0 to >36 inches
- Mosaic of tall (4-6 feet) emergent vegetation and open water
- 30%-70% cover of native emergent vegetation (cattail, bulrushes, sedges, rushes, smartweeds, wild millet)
- Submergent plants (e.g., pondweeds) in open water

- <5% cover of invasive plants (e.g., purple loosestrife)
- Wetland areas of importance to nesting and migrating birds and other wildlife protected from human-caused disturbance

Strategies Applied to Achieve Objective

Use prescribed fire, discing, mowing, and herbicides to remove extensive emergent stands (e.g., cattails).

Implement water-level management (flood-up and drawdown) using water control structures.

Develop/secure reliable water sources (including water rights) and lift-pump systems, as needed.

Use scraping and contouring to produce a variable-bottom topography.

Modify the time and purpose of use (from irrigation to wildlife use) for existing water rights on the Leavitt Tract.

Reseed and/or revegatate with a mix of emergent vegetation.

Exclude cattle from Leavitt Tract wetland.

Finalize transfer of Upper Dam Marsh (and adjacent uplands) from Reclamation to FWS.

Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).

Rationale: The Refuge was established to provide refuge and breeding grounds for migratory birds and other wildlife. Providing a diversity of wetlands is vital to the Refuge's purposes. Wetlands provide habitat for fish and wildlife; improve water quality by filtering sediments and chemicals; reduce flooding; recharge groundwater; protect biological diversity; and provide opportunities for educational, scientific, and limited recreational activities. Outside of wetlands' use by waterfowl and other migratory birds, little is known about the vegetative composition of or aquatic species inhabiting Lake Lowell Unit's wetlands.

Wetland basins should be at least 1 acre if the primary concern is waterfowl production (Hudson 1983). However, Williams (1985) reported that bird species diversity increases with a wetland area up to 10 acres, and species richness is more stabilized in larger wetlands. Water depths should vary throughout a wetland basin to attract a wide variety of flora and fauna but should not exceed 8 feet for optimum wetland plant development. Shorelines should consist primarily of gently sloping gradients (1:10) if the primary objective is to maximize wetland vegetation production and waterfowl use (Cole et al. 1996).

Refuge wetlands at the Lake Lowell Unit (three wetlands totaling approximately 85 acres, including the Upper Dam Marsh, Rambo Pond, and the Leavitt Tract) should be managed to mimic natural disturbance mechanisms, thus providing and maintaining the cyclical aging and renewal processes of wetlands over time. By maintaining a number of acres of open shallow marsh through active management such as mechanical soil disturbance and water-control infrastructure, the Refuge can provide a diversity of early successional vegetation stages that increase overall biodiversity.

Invasive plants (e.g., cattails and purple loosestrife) are widespread in Refuge wetlands. Invasive plants limit native plant production and cause impacts to food, nesting habitat, and cover for wildlife. Invasive plants in wetlands reduce waterfowl food availability during the migration and wintering periods.

Cattails generally occur as scattered sterile plants in high-quality natural areas. Disruptions of hydrology, wildfire suppression, or system enrichment may favor cattail growth. System disruption is often followed by the growth of dense monocultures of cattails that may reduce habitat heterogeneity and eliminate other plants. Mechanical and chemical methods, prescribed burning, and several other methods of cattail control are available. Reliable control is achieved when any method reduces and maintains the stature of live and dead cattail stems below water levels for a period of one to three years (Apfelbaum 1985). A step-down plan for invasive species abatement will be developed following completion of the CCP.

The Refuge has minimal water-management capabilities on these wetlands. Refuge staff will work toward ensuring the dependability of water to these wetland areas. With the exception of Rambo Pond,

the wetlands retain water throughout the summer, though significant reduction in surface area and depth may occur. Water levels in the Rambo Pond appear to vary due to seepage from groundwater and timing of when the water is pumped in. These wetlands support primarily submergent plant species.

The Leavitt Tract simulates a wet meadow and is used as foraging habitat by Canada geese, ducks, Sandhill cranes, and shorebirds and as nesting habitat for northern harriers and ducks. Wet-meadow vegetation may have included native species historically, but this site has been largely taken over by cattails. Currently, the Leavitt Tract attracts ducks and geese during the fall and winter.

Scraping and contouring of these wetlands may be beneficial in a few ways. The Leavitt Tract and the Upper Dam Marsh consist of a monoculture of cattails that could be removed most easily by heavy equipment initially, after which a regime of mowing and discing could maintain the wetlands. Modifying the wetlands to provide more edge, shoreline, and island structure for waterfowl and shorebirds could also be beneficial. Removing sediment buildup in the shallow ponds will deepen them, making the wetland more of a permanent structure.

The degradation of sensitive riparian habitats by livestock has been well studied, and some of the negative impacts from livestock include compaction of soil, which increases runoff and decreases water availability to plants; significant removal of vegetation, which allows soil temperatures to rise, increases evaporation on the soil surface and reduces resources available to native wildlife; and physical damage to vegetation from rubbing, trampling, and browsing (Severson and Boldt 1978). If the Refuge is to maintain wetland habitat as a priority resource for waterfowl and other wildlife, cattle need to be excluded from wetland areas and managed in the nearby uplands at appropriate stocking rates and times of the year (see Objective 2.3.5.2).

2.3.4 Goal 4 (Shrub-steppe): Protect, maintain, and enhance shrub-steppe habitats characteristic of the historic Columbia Basin

Objective 2.3.4.1. Protect, maintain, and enhance shrub-steppe habitat– Lake Lowell
Protect 830, maintain 520, and enhance 300 acres of shrub-steppe communities surrounding Lake Lowell, benefiting migratory birds (e.g., sage thrasher, loggerhead shrike, burrowing owls) and a diverse assemblage of other shrub-steppe-dependent species. These habitats should be characterized by the following attributes: • Unfragmented stands of 20 to >50 acres • 25% canopy cover of native shrubs, including sagebrush, bitterbrush, saltbush, and rabbitbrush • 25% cover of native perennial forbs/bunchgrasses (bluebunch wheatgrass, Great Basin wildrye, Idaho fescue) • <25% cover of invasive plants (e.g., cheatgrass, puncturevine, tumbleweed) • No rush skeletonweed present • 15% cover of bare ground • Refuge areas for wildlife protected from human-caused disturbance
Strategies Applied to Achieve Objective
Seed and plant native shrubs, forbs, and bunchgrasses with emphasis on areas adjacent to previously restored areas (i.e., CC Lightning Fire and Sage Fire areas) and areas beneficial for research and/or EE.
Rehabilitate shrub-steppe that has been damaged in unplanned fire events with native shrubs, forbs, and bunchgrasses.
Use 163 acres of restored steppe habitat to research cheatgrass control methods. Priority will be given to the North Side Recreation Area and adjacent areas, and the CC Lightning Fire area and adjacent areas.
Remove and rehabilitate unnecessary internal fire breaks through green-stripping.

Use prescribed fire and mechanical treatments for hazardous fuels reduction.
Implement land-based seasonal closures to protect nesting and wintering areas. See Objective 2.4.1.3.
Seasonally restrict travel to designated roads and trails to reduce and/or prevent habitat impacts and disturbance to wildlife. See Public Use Objective 2.4.1.3.
Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).
Rationale: Uplands on the Refuge typically consist of patches of big sagebrush with a cheatgrass understory between Lake Lowell, agricultural fields, fences, roads, and irrigation dikes. Even though most of the vegetation is nonnative, these areas provide nesting and foraging habitat for ground-nesting birds, resting and feeding areas for flocks of geese, foraging space for raptors, and habitat for small mammals and other wildlife. Currently the Lake Lowell Unit has approximately 830 acres of this upland or shrub-steppe habitat. The area near the Visitor Center has the largest contiguous piece of sagebrush habitat on the Refuge at approximately 550 acres. Sagebrush ecosystems and the wildlife that depend on them are thought to be among the most imperiled in North America (Dobkin and Sauder 2004; Knick and Rotenberry 2002; Knick et al. 2003; Mac et al. 1998). Populations of shrubland and grassland birds, which represent an important component of the biodiversity in the western United States, are declining more rapidly than other groups of bird species in North America (Dobkin 1994; Knopf 1994; Saab and Rich 1997; Vickery and Herkert 1999). Declines in sagebrush-dependent species can be attributed to the once greater than 60 million hectares of the Intermountain West shrub-steppe habitat being degraded, fragmented, converted to agriculture, or changed to vegetative states dominated by exotic annual grasses (Miller and Eddleman 2001; West 1996). These disturbance regimes have accelerated soil erosion and the loss of sagebrush ecosystems (Bunting et al. 2003; West and Young 2000) to a point where the ecological integrity may be pushed beyond a threshold from which they can recover (Allen 1988; Belnap and Eldridge 2001). Conservation and restoration of sagebrush lands are becoming high priorities for natural resource agencies because of changing attitudes about the intrinsic value of sagebrush ecosystems and the threat of petitions to list species under the Endangered Species Act (Bureau of Land Management [BLM] 2002). Deer Flat NWR is particularly vulnerable to invasive plant infestations due to a combination of surrounding land management practices and high levels of human use. Seeds and propagules can transfer across boundaries along trails (human and wildlife), rivers, utility corridors, and roads. Recreational use by bird watchers, hikers, hunters, cyclists, joggers, photographers, equestrians, and dog walkers can create a high probability for propagules to enter and be distributed into even remote areas. Currently there is minimal management of natural vegetation due to large areas, low budgets, and staff shortages. The constant flood of new propagules into desert regions, especially near urbanized areas, increases the probability that new populations (of invasive species) will become established. One of the biggest challenges for land managers is to identify these problematic species and control them before they establish and spread in wildland areas (Brooks and Pyke 2001). Mowing, grazing, burning, tilling, and reseeding of existing shrub-steppe habitat will be used to attempt to restore small tracts of Refuge uplands to provide presettlement conditions for obligate bird species and other terrestrial vertebrates as well as provide a working example and educational opportunity for future studies. In one study, repeated mowing (every three weeks) during the spring and summer was found to be as effective at controlling cheatgrass seed production as an application of glyphosate, when initiated in the year following a prescribed fire treatment (Ponzetti 1997). This method was very labor-intensive, and a cost/benefit analysis should be conducted before any choice is made. Refuge staff will attempt to continue, augment, and improve past restoration efforts. The strategic placement of fire breaks will be re-evaluated, and those identified as superfluous will be exploited for green-stripping and restoration efforts.

There is substantial evidence that human presence can cause significant impacts to bird behavior and fecundity. For birds, human disturbance can impact foraging habits (Skagen et al. 1991), reduce song occurrence and consistency (Gutzwiller and Marcum 1993), and reduce reproductive success (Safina and Burger 1983). Knight and Cole (1995b) pointed to multiple studies that showed human disturbance can also alter nesting behavior. The effects of human intrusion increase when accompanied by dogs. One study showed that dog walking in woodland leads to a 35 percent reduction in bird diversity and 41 percent reduction in abundance, both in areas where dog walking is common and where dogs are prohibited (Banks and Bryant 2007). To minimize disturbance to wildlife, people engaged in recreational activities will be required to stay on trails from February 1 to July 31. In addition, dogs will be required to be on leash, and will be allowed only on designated trails and in the Lower Dam Recreation Area (see Objective 2.4.1.4). The general and Refuge-specific effects of human-caused disturbance to wildlife are presented in Appendix B.

Objective 2.3.4.2. Protect, maintain, and enhance shrub-steppe habitat – Snake River Islands

Protect, maintain, and enhance 104 Refuge islands with shrub-steppe habitat on the Snake River, benefiting nesting and migrating birds (e.g., geese and mallards) and a diverse assemblage of other shrub-steppe-dependent species. These habitats should be characterized by the following attributes:

- 0%-50% cover of <8 feet native shrub species (e.g., sagebrush species, fourwing saltbush, rabbitbrush, greasewood, golden currant, wild rose)
- >50% cover of native grasses and forbs (e.g., Great Basin wildrye, bluebunch wheatgrass, Indian ricegrass, western wheatgrass, Idaho fescue, smooth brome, salt grass)
- No invasive woody trees (e.g., Russian olive, salt cedar)
- <25% cover of invasive plants (e.g., Scotch thistle, cheatgrass, whitetop)
- No rush skeletonweed, leafy spurge, or yellow starthistle present

Strategies Applied to Achieve Objective

Seed and plant native shrubs, forbs, and bunchgrasses, particularly following invasive species treatments on 2-10 islands.

Use prescribed fire and mechanical treatment to reduce hazardous fuels on 2-10 islands.

Aerially apply the herbicide metsulfuron to control extensive infestations of whitetop on 2-10 islands.

Graze goats on select islands to prevent woody invasion and set back succession as appropriate for nesting Canada geese.

Implement seasonal closures to prevent disturbance to waterfowl and colonial-nesting birds. See Public Use Objectives 2.4.1.3 and 2.4.3.1.

- All Refuge islands closed February 1 to June 14 during goose nesting season.
- Some Refuge islands (currently four to six islands) closed February 1 to July 1 to reduce disturbance to colonial-nesting birds (e.g., herons, gulls, and terns).

Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).

Rationale: The importance of shrub-steppe habitat and the responsibility of Federal land managers to enhance and protect this landscape are discussed in Objective 2.3.4.1. Monitoring of Canada geese nesting on the Snake River Islands Unit has been done by Refuge staff since the 1960s because the area is an important nesting area for resident flocks. Goose nesting platforms and wood duck boxes are in place and are maintained by Refuge staff, volunteers, and partners. The islands also provide nesting habitat for other species of birds, including raptors, owls, cormorants, herons, gulls, and a wide variety of songbirds.

Vegetative structure varies from island to island, but most include both upland and riparian habitat. Highest priority areas for restoration will be based on GIS modeling that includes a ranking system that will identify the most biologically intact islands which are likely to provide good habitat. Factors that will be modeled include size, current condition (existing habitat, noxious weeds, nesting activity), neighboring

land use, and isolation (measure of flow and channel depth) (see Objective 2.3.6.4). By starting with small projects, the Refuge could monitor effectiveness, predict future funding needs, and develop a long-term strategy for enhancing riparian habitat on the Refuge islands.

Protection and management of shrub-steppe habitat on the Snake River Islands Unit presents a different set of challenges than at the Lake Lowell Unit. Fluctuating water levels causes some islands to be more accessible to livestock from neighboring shores during lower flow regimes. Refuge staff may use fencing, law enforcement, and partnering with adjacent landowners to control livestock trespass on the islands.

The control of invasive species on the Snake River Islands Unit presents some unique challenges due to the logistics of getting people and equipment onto the islands for effective control measures. Some of the islands are so choked with invasive woody species (e.g., tamarisk), large monocultures of noxious weeds (e.g., whitetop), and cheatgrass that conventional land-based mechanical control is restricted. Using aerial spraying may be more cost effective than attempting to get personnel and materials over the water and onto the islands to implement physical control measures. Successful control usually requires repeated applications with foliar herbicides as well as reseeding and planting of desirable species within treatment areas. Islands will be prioritized and treated accordingly.

Alternative methods for invasive species control on the islands will also be researched and implemented as needed. Methods like using goats to graze on select islands to prevent woody invasion and set back succession as appropriate for nesting Canada geese may be a viable alternative. The use of mechanical treatments and prescribed fire to remove large areas of invasive species may be the most cost-effective way of encouraging a more desirable shrub-steppe landscape.

The current closure dates for the Snake River Islands Unit do not correspond with the dates of needed protection. Canada geese in this area generally start hatching at the end of April or beginning of May, but hatching has been noted well into June (Steele et al. 1957). Molting of flight feathers happens around the same time, and geese are more vulnerable to disturbance when they are land-bound with young. To provide protections through this vulnerable time, island closures should be extended to June 14. There are a few (four to six) Refuge islands that have historically held nesting colonies of herons, egrets, cormorants, and gulls. The existing closures do not adequately cover the sensitive nesting time for these birds and need to be lengthened to provide needed protection. Islands that have nesting colonies or rookeries (present and future) will be closed from February 1 through June 30. The general and Refuge-specific effects of human-caused disturbance to wildlife are presented in Appendix B.

2.3.5 Goal 5 (Agriculture): Protect, maintain, and enhance managed grasslands and agricultural crops to support migrating waterfowl as well as resident wildlife

Objective 2.3.5.1. Maintain grain and forage crops

Maintain a diversity of grain and green forage crops on 250 acres, benefitting migratory birds (e.g., Canada geese, dabbling ducks) and other resident wildlife. Croplands will be characterized by the following attributes:

- As of October 1, ≥25% of total crop acreage is left standing and is a wildlife forage crop
- As of October 1, alfalfa must be 6 inches tall and winter wheat must be 3 to 6 inches tall.
- No cutting between April 15 and June 15 to avoid destroying ground-nesting birds.
- Minimize winter till on Refuge farmlands
- <10% presence of invasive plants (e.g., *Kochia*, field bindweed, Russian thistle)

The area enhanced (i.e., for shoreline plantings) will vary depending on water levels and the ability to agree on appropriate in-water acreages with the Board of Control.
Strategies Applied to Achieve Objective
Use crop rotation as a mechanism to improve soil tilth and as a strategy to control invasive/undesirable plant species in agricultural lands.
Use cooperative farmers.
Knock down corn after hunting season.
Use the following BMPs: leaving residues, filter strips, and buffers along field edges.
Install one new well near Farm Field 5 to better farm current acres.
No cutting allowed between April 15 and June 15.
Ensure wildlife crop share is at least 25%.
Implement shoreline plantings (millet, buckwheat, and/or winter wheat) in areas adjacent to Farm Field 5.
Develop cooperative land management plan.
Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).
Rationale: The Refuge farm fields are an important food source for waterfowl and other wildlife when natural foods are limited. The lake contains minimal submerged aquatic food for waterfowl because of poor water quality, unreliable water levels, and large numbers of carp. The smartweed beds provide natural food only when they are sufficiently flooded in the summer for the production of seed and flooded in the fall to allow for waterfowl access. Much of the surrounding landscape has been converted from agriculture to low-density development, resulting in food loss for wintering waterfowl. In addition, crops grown in many of the remaining fields include higher-value specialty crops such as seed alfalfa, onions, and mint that are not as valuable to wildlife. Also, more efficient harvesting equipment leaves little waste grain in the field for waterfowl. "Clean farming," which involves plowing and tilling in the fall to reduce the spread of noxious weeds, also reduces the amount of waste grain left in the fields prior to the peak of waterfowl concentrations. As a result, the availability of winter browse and nutritional foods off-refuge has been substantially reduced. Because this trend is likely to continue into the future, cooperative farming will be essential for waterfowl management. Although wintering waterfowl numbers have declined over time, numerous waterfowl still winter at the Refuge (see Chapter 4). Refuge crops provide a consistent food source for the wintering waterfowl and therefore are important to continue. One significant change may be implemented as part of the cooperative farming program. The basic objective for cropland management has been to produce green browse and high-nutrition foods for waterfowl. Historically, one of the biggest changes in the farming program included the elimination of shoreline plantings, likely due to budget constraints at the time. At one time, approximately 400 acres were farmed on the Refuge, which included planting millet along some of the lake shorelines. Because lakeshore plantings can be less labor intensive and do not require irrigation, they can be a less costly option than expanding cooperative farming. As development continues around the lake, use of this strategy may be implemented to achieve Refuge goals and objectives. Studies have shown that BMPs like crop rotation can reduce the amount of weed species in agricultural fields (Liebman and Dyck 1993) and improve soil tilth and carbon sequestering capabilities (West and Post 2001), thereby reducing the amount of pesticides and fertilizers needed for profitable farming. Other Refuge practices like knocking down share-crop corn after the hunting season so that waterfowl have easier access to it will also continue on cooperatively farmed land. The strategies are either existing practices or improvements. In addition to BMPs, special conditions currently in place will continue, including restricting pesticide uses, limiting the types of crops grown, no grass-crop harvesting April 15 through June 15 (to reduce the risk of destroying nests of ground-nesting birds), and a requirement to have 6 inches of green browse by October 1. Conditions for cooperative farming will be identified in a cooperative land management plan.

Objective 2.3.5.2. Protect, maintain, and enhance managed grasslands to benefit migratory and wintering waterfowl
Protect and maintain 80 acres, and within two years enhance 80 acres (Leavitt Tract) of improved pasture for wintering waterfowl with the following attributes: • Mix of desirable, palatable grasses (e.g., perennial ryegrass, orchard grass, fescues) and forbs (e.g., clover) with a height of <4 inches by October 15 in fields and along field/wetland interfaces. • <20% cover of invasive species • No encroaching woody vegetation
Strategies Applied to Achieve Objective
Use herd rotation as a mechanism to reduce soil compaction and control invasive/undesirable plant species in grazing lands.
At Leavitt Tract, clean ditches and update irrigation infrastructure (i.e., redo corrugations and replace irrigation checks) to provide better water control.
Re-establish permanent goose pasture by interseeding cool-season perennial grasses at the Leavitt Tract.
In addition to grazing, manage short grasses by haying, mowing, burning, and other means.
Graze Leavitt Tract from April 1 through August 15. Determine if grazing during this time period is impacting ground-nesting birds.
Develop cooperative land management plan and grazing management plan.
Conduct grazing fee market analysis to evaluate current grazing fees.
Use enhanced IPM techniques including mechanical/physical (e.g., mowing), chemical, cultural, and biological methods to control or eradicate invasive species (see Appendix G).
Rationale: Grazing is allowed on refuges if it achieves a management goal that will benefit wildlife. The only area on the Refuge that currently has grazing is the Leavitt Tract, its purpose is to maintain short grasses to benefit wintering Canada geese. To provide high-quality forage for wintering and migrating geese, the Refuge has used grazing to ensure that young shoots less than 6 inches tall are available annually by early October to reduce the accumulation of thatch, which can reduce the number of shoots. Other tools for managing grasslands for geese include mowing and prescribed fire. Both of these tools, if used properly, can achieve similar benefits as grazing and may be implemented as necessary. Grazing can be used to set back succession, increase native annual forb species and cover, and decrease vegetation height and litter depth (Hayes and Holl 2003), all of which are beneficial to foraging Canada geese. However, studies have also shown negative impacts of grazing, including altering species composition, decreasing density and biomass of individual species, reducing species richness, and changing community organization (Fleischner 1994). Vavra (2005) also showed that grazing can alter species composition and that it can increase the productivity of selected species, increase nutritive quality of the forage, and increase diversity of the habitat by altering its structure. Geese use refuge pastures for foraging, preferring young shoots that are higher in protein and lower in fiber than mature stems (McLandress and Raveling 1981). Some refuges use grazing in improved pasture in an attempt to increase the amount of edible green shoots available for wintering geese (Greenwalt 1978). Therefore, grazing will continue to be allowed at the Leavitt Tract to benefit wintering Canada geese, but Refuge staff will monitor potential impacts to wildlife and habitat. The impacts of grazing depend on many factors including timing, habitat type, and stocking rate. An evaluation of the current Refuge grazing program, including infrastructure maintenance (irrigation ditches, fences), stocking rate, habitat impacts, wildlife use, and grazing fees has not been conducted in many years. Development of a cooperative land management plan and a grazing management plan will address these concerns. The cooperative land management plan will be written after the CCP is complete and will include a description of the agreement between the Refuge and the private farmer to manage the land for both parties. Typically the cooperator is responsible for pasture management, weed control, and installation and maintenance of fencing, whereas the Refuge maintains pumps, supplies fencing materials,

and constructs access roads. The grazing management plan will better define the objectives of grazing, as well as the amount of stock to be grazed and any time restrictions necessary to meet biological management goals. The management plan will also identify what habitat and/or wildlife will be monitored to determine the benefits and/or impacts of the grazing program.

2.3.6 Goal 6 (Research): Gather sufficient scientific information to guide responsible adaptive management decisions for the Refuge's trust resources

Objective 2.3.6.1. Monitoring activities
A prioritized list of monitoring activities to support Refuge resource management decisions follows.
Strategies Applied to Achieve Objective
Develop an inventory and monitoring plan.
Monitor public-use activities on Lake Lowell to evaluate wildlife disturbance effects.
Implement shorebird surveys to determine importance of Lake Lowell unit to migrating shorebirds.
Implement point counts to characterize importance of riparian habitat to migrating and nesting passerines.
Early detection and rapid response monitoring to identify new or spreading invasive plant and animal species (e.g., zebra and quagga mussels [*Dreissena polymorpha* and *D. rostriformis bugensis*).
Monitor the effectiveness of IPM activities to control/eradicate invasive plants on the Refuge.
Monitor habitats (e.g., wetlands, shrub-steppe, riparian) to establish baseline and evaluate achievement of objectives for adaptive management.
Evaluate and analyze historical biological data (e.g., waterfowl counts and goose nesting data) to determine long-term population trends and reliability of the data.
Monitor nesting density and success of waterfowl on Snake River Islands Unit.
Monitor waterfowl populations during fall and winter on Lake Lowell Unit to develop long-term population trends.
Install and monitor water-level gauges in Refuge wetlands.
Conduct annual grebe nesting and brood count surveys.
Monitor dog walking leash compliance and associated wildlife impacts.
Monitor effectiveness and impacts of integrated pest management.
Rationale: Monitoring the wildlife and vegetation response to habitat management practices is necessary to implement adaptive management techniques on the Refuge. The NWRS Improvement Act requires the Service to monitor the status and trends of fish, wildlife, and plants on each refuge. An inventory and monitoring plan needs to be developed that will include monitoring of vegetation and wildlife in order to measure responses to habitat management activities, and the response of vegetation and wildlife to habitat restoration projects. Existing staff and funds are prioritized to perform the most pressing habitat management projects on the Refuge, leaving few resources available to conduct studies of the effectiveness of habitat management or restoration treatments. This lack of data hinders the Refuge's ability to use adaptive management to evaluate the effectiveness of its management practices and make necessary course corrections. At Deer Flat NWR, there is a lack of data for both managed sites as well as appropriate reference sites that are necessary to account for variability. A substantial body of scientific literature has documented the disturbance effects of human activities, including recreational activities on wildlife (Bartelt 1987; Boyle and Sampson 1985; Cole and Knight 1990; Havera et al. 1992; Klein 1993; Knight and Cole 1995b; Madsen 1995; Pease et al. 2005). The Refuge is mandated by law to provide wildlife-dependent recreational opportunities that do not materially interfere with the Refuge's ability to manage according to its purposes. Nesting waterfowl and waterbirds, such as great blue herons, western grebes, and Clark's grebes, are a few species of particular concern at the Refuge because they are especially sensitive to disturbance. The Refuge must design and evaluate public use programs based on the best available science while considering disturbance effects. By

monitoring changes in wildlife-use patterns that follow changes to public-use programs and facilities, the Refuge manager will be able to make adjustments if disturbance reaches unacceptable levels.

Objective 2.3.6.2. Inventory Activities
The following is a prioritized list of inventory activities to support resource management decisions on the Refuge.
Strategies Applied to Achieve Objective
Develop an inventory and monitoring plan.
Inventory and map invasive exotic plants on both Refuge units.
Conduct breeding and migratory bird inventory of shrub-steppe and riparian habitats on both units.
Inventory bat use on both Refuge units.
Inventory riparian habitat structure and composition on both Refuge units.
Estimate fuel loading in riparian habitat on both Refuge units.
Inventory wildlife use of wetlands.
Inventory plant species composition of emergent beds associated with Lake Lowell.
Rationale: Maintaining an inventory of the Refuge's wildlife and vegetation is necessary to implement adaptive management techniques. The NWRS Improvement Act requires the Service to monitor the status and trends of fish, wildlife, and plants on each refuge. An inventory and monitoring plan needs to be developed that will include monitoring of vegetation and wildlife to measure responses to habitat management and public uses. Existing staff and funds are prioritized to perform the most pressing habitat management projects on the Refuge, leaving few resources available to conduct studies of the effectiveness of habitat management or restoration treatments. This lack of data hinders the Refuge's ability to use adaptive management to evaluate the effectiveness of its management practices and make necessary course corrections. At Deer Flat NWR, there is a lack of data for both managed sites as well as appropriate reference sites that are necessary to account for variability.

Objective 2.3.6.3 Research
A prioritized list of research projects that will support Refuge resource management decisions follows.
Strategies Applied to Achieve Objective
Conduct research to determine species-specific thresholds for disturbances from public use and habitat management actions implemented as a result of the CCP.
Conduct an on-refuge contaminant investigation to comprehensively evaluate potential contaminants in sediments, water, invertebrates, and vegetation associated with Lake Lowell to assess risks to fish and wildlife, especially fish-eating birds such as bald eagles, double-crested cormorants, western grebes, herons (great blue and black-crowned night), and pelicans.
Conduct a contaminant investigation to identify and quantify contaminants in water inflows to Lake Lowell in conjunction with Reclamation.
Conduct a contaminants investigation for the Leavitt Tract to determine if rehabilitation and ground disturbance are feasible.
Determine the population structure (age and sex ratios), movements, size, and potential habitat impacts of mule deer on the Lake Lowell Unit.
Determine the population structure (age and sex ratios), size, movements, and potential habitat impacts of mule deer on the Snake River Islands Unit.
Research shorebird disturbance and highest shorebird use areas and determine importance to shorebirds on a regional basis.
Determine if planting of crested wheatgrass in cheatgrass-dominated areas, followed by native bunchgrass planting is a successful restoration technique (Cox and Anderson 2004).

Research the efficacy of biological control methods for cheatgrass.
Evaluate the zone of influence of leashed versus unleashed dogs.
Assess current and potential fuel loading in riparian habitat.
Rationale: Results of research studies will help the Refuge to better accomplish the goals and objectives defined in this plan as well as study issues that will be addressed in step-down plans or issues that are outside of the scope of the CCP. A substantial body of scientific literature has documented the disturbance effects of human activities, including recreational activities on wildlife (Bartelt 1987; Boyle and Sampson 1985; Cole and Knight 1990; Hamann et al. 1999; Havera et al. 1992; Klein 1993; Knight and Cole 1995b; Madsen 1995; Pease et al. 2005). The Refuge is mandated by law to provide wildlife-dependent recreational opportunities that do not materially interfere with the Refuge's ability to manage according to its purposes. Nesting waterfowl and waterbirds, such as great blue herons, western grebes, and Clark's grebes, are a few species of particular concern on the Refuge because they are especially sensitive to disturbance. The Refuge must design and evaluate public-use programs and facilities based on the best available science while considering disturbance effects. By monitoring changes in wildlife use patterns that follow changes to public use programs and facilities, the Refuge manager will be able to make adjustments, should disturbance reach unacceptable levels.

Objective 2.3.6.4. Assessments and Information Needs
The following is a prioritized list of scientific assessments and information needs to support resource management decisions on the Refuge.
Strategies Applied to Achieve Objective
Assess use of goose nesting platforms to determine if they are important to the success of nesting Canada geese on the Snake River Islands Unit.
Conduct soil survey of shrub-steppe habitats as a basis for long-term restoration potential and to create a data layer for use in GIS.
To identify the islands with maximum potential long-term value to nesting waterfowl and landbirds, conduct an assessment to prioritize Refuge islands considering the following factors: isolation (function of channel width and depth along with river flow); island size (smaller islands have less predation by mammalian predators); native species well represented in riparian and shrub-steppe; history of waterfowl nesting and nesting success; and >1 mile from livestock operations (for protection from trespass and cowbird parasitism). For isolation consider the worst-case scenario (lowest potential flows in the future).
Conduct real-time kinematic surveys to determine wetland bottom topography and assess Ferrari's (1995) bathymetry mapping.
Complete water resource assessment for the Refuge through the Division of Engineering, Water Resources Branch.
Develop a National Vegetation Classification Standard vegetation data layer for use in GIS for both units.
Assess quality of Refuge wetlands (i.e., conduct function and values assessment).
Assess the quality/importance of grassland areas on the south side of the Lake Lowell Unit.
Work with partners to obtain funding for a feasibility study that will identify the best methods to improve the water quality (e.g., reducing phosphorus and silt) of Lake Lowell.
Rationale: The Refuge is tasked with using the best available scientific information to make adaptive management decisions in accordance with 522 DM 1 (Implementing Adaptive Management Policy). Many of the tasks described above will serve as baseline information that the Refuge could use to better manage its public-use programs and to achieve the biological goals and objectives of this plan. Much of the information to be collected is baseline information, such as the vegetation map and accurate bathymetry of the lake, and will aid the Refuge in developing more precise management prescriptions (e.g., invasive species treatment, forest management, desired water level conditions) and evaluating the results of habitat restoration and wildlife management actions.

2.4 Public Use and Cultural Resource Goals, Objectives, and Strategies

2.4.1 Goal 1 (General Visitor Services): Visitors of all ages will enjoy native wildlife and increase their understanding and appreciation of the importance of the Refuge as wildlife habitat

Objective 2.4.1.1. Welcome and orientation
Within 5 years, develop a visitor services plan to integrate welcome and orientation features, facilities, programs, activities, and experiences on the Refuge. Welcome and orientation features will: • Use both electronic and printed media to reach and orient visitors to the Refuge. • Provide daily opportunities for personal contact with Refuge staff or volunteers. • Be available in Spanish and English. • Provide appropriate visitor amenities at developed sites, such as toilets and picnic tables. • Be consistent with quality criteria in Section 2.2.2.
Strategies Applied to Achieve Objective
Install entrance signs at high-use visitor access points and along high-traffic roads bordering the Refuge.
Install orientation signs that alert visitors to the presence of nearby Refuge facilities (e.g., "boat launch," "fishing area," "Visitor Center") on main roads in appropriate locations.
Provide trail signs at all trailheads.
Provide positively worded welcome and orientation/interpretive materials (e.g., maps, brochures, signs) at attractive and visible kiosks near main Refuge access points and at areas where visitors tend to congregate. To encourage compliance, materials will explain, when possible, the regulation's benefit(s) to wildlife or wildlife habitat. • Provide kiosks at high-visitation areas at Lake Lowell Unit, such as Lower Dam Recreation Area and Upper Dam boat launches. • Provide kiosks at major Snake River Islands Unit access points. Within 5 years of CCP implementation, update panels on these kiosks.
Develop site plan for the Lower Dam Recreation Area to increase educational and interpretive opportunities, improve parking and safety, and improve wildlife habitat.
Develop a site plan for either Upper Dam East, Upper Dam West, or Lower Dam Recreation Area boat launch, to provide at least one ABA-accessible boating opportunity.
Construct a visitor contact station (VCS) at Lower Dam Recreation Area. If possible, the existing EE building will be used for the VCS. Continue to allow use of EE building for environmental education activities until building is converted to VCS.
Allow Refuge access through designated entrances marked as Parking Area or Refuge Access on Map 4.
Provide modern restroom facilities at Lower Dam Recreation Area.
Provide additional bathroom facilities at high-use access points.
Rationale: Customer service and first impressions are important to visitors feeling safe and welcome at national wildlife refuges. Although 96 percent of visitors to the Lake Lowell Unit of the Refuge are from the local area (Sexton et al. 2012), interactions with visitors make it clear that many do not realize that they are at a national wildlife refuge or do not realize what that means. Visitors to the Snake River Islands Unit may also not know. Refuge visitors will therefore benefit from increased opportunities to have personal contact with Refuge staff and volunteers, as well as an integrated set of welcome and orientation features that are easily found

and provide accurate, timely, and appropriate orientation materials and information on Refuge facilities, programs, activities, and experiences. These strategies will also increase the Refuge's visibility and promote visitor compliance with Refuge regulations. By increasing staff and volunteer contact with visitors at high-use areas, staff will also gain a better understanding of visitor use patterns.

The designated strategies focus on providing high-quality visitor services and improving information availability by using modern media, exhibits, and orientation panels that are clean, maintained, and accessible; that do not detract from the surroundings; and that provide clear, frequently updated information about where visitors can go, what they can do, and how to safely and ethically engage in Refuge recreational activities. Orientation materials will explain, when possible, the wildlife or habitat benefit of Refuge regulations to encourage compliance.

The Lower Dam Recreation Area will be redesigned to improve traffic flow, provide a VCS, and provide more wildlife-dependent recreational opportunities. Parking and access for boat launches, buildings, and beaches at the Lower Dam Recreation Area are extremely restricted on busy weekends. A new site plan will be developed to improve traffic flow, functionality, and safety at the Lower Dam Recreation Area. Providing volunteer and staff contact at a VCS at this high-use area will increase awareness of the Refuge and Refuge regulations, as well as increasing the enjoyment of visitors by providing information about recreational opportunities around the Refuge.

New restroom facilities are proposed in response to interest in improved restroom facilities.

Objective 2.4.1.2. On-site interpretation

Within 5 years of the CCP's approval, develop a visitor services plan to integrate accurate, timely, and appropriate interpretation of Refuge wildlife, habitats, and other resources at the Visitor Center and high-use access points through programs, activities, and experiences on the Refuge for 37,700 visitors of all ages and abilities annually. Interpretive programs will be characterized by:

- A mix of traditional and modern techniques to reach visitors with a variety of learning styles.
- Accessible facilities.
- Translation into Spanish (for interpretive materials).
- Consistency with quality criteria in Section 2.2.2.

Strategies Applied to Achieve Objective

Increase interpretive opportunities for visitors at high-use access points. For example:

- Use staff and volunteers to facilitate guided/roving interpretive programs (e.g., bird walks, nocturnal walks, canoe/kayak paddles, boating scavenger hunts) on designated themes at high-use visitor access points to increase visitors' awareness of these themes.
- Provide interpretive signs on new and existing trails and facilities.
- Develop a nature exploration area at Lower Dam Recreation Area initiated through a community-based design effort involving key stakeholder groups.

Within three years of CCP implementation, provide at least four on-site outreach events (e.g., BioBlitz, Creepy Critters, National Wildlife Refuge Week) annually, to expand public awareness of interpretive themes.

Update and replace existing Visitor Center interpretive materials. For example:

- Develop Refuge video to show at Visitor Center.
- Update and replace existing interpretive signs.

Allow use of Visitor Center auditorium only by wildlife-dependent recreation groups for their organizational meetings.

Rationale: Interpretation, when compatible, is a priority public use of the NWRS, it can foster an understanding of and appreciation for our natural resources. Many visitors to national wildlife refuges,

including Deer Flat NWR, enjoy participating in guided and self-guided interpretive opportunities. Interpretation can also be an effective resource management tool by providing visitors the opportunity to learn about natural resources, refuges, and the NWRS, as well as helping them understand their role and how their compliance with rules and regulations can help solve or prevent management problems. We will work with partners to provide enhanced interpretive opportunities at both units.

Interpretive themes will focus on increasing awareness and understanding of the Refuge and NWRS, of how to be a better Refuge visitor, and of issues facing the Refuge and Refuge wildlife and habitat. Examples of themes include:

- What is a national wildlife refuge? What is the Refuge's purpose?
- The North American model of wildlife management.
- The role of Lake Lowell in irrigation.
- How visitors can help conserve the Refuge and other wildlife habitats.
- Water quality, water conservation, and watersheds.
- Invasive species (e.g., carp, plants, domesticated animals, aquatics).
- Migration (e.g., waterfowl, neotropical migrants).
- Individual wildlife species (e.g., waterfowl, grebe) and their habitat requirements.
- Urbanization impacts.

Interpretation will be emphasized over EE because we will expect a wide diversity of user groups, and interpretation has the flexibility to reach broader audiences. On-site interpretation allows direct contact with and education of Refuge users and will therefore be more efficient than EE programming to increase visitor understanding of interpretive themes and to increase compliance with Refuge regulations. These programs will aim to interact with visitors at high-use access points to increase awareness of the Refuge and its wildlife and habitats. The VCS proposed at the Lower Dam Recreation Area could act as a base of operations for roving interpreters.

Interpretive materials are currently provided only at and near the Visitor Center/Refuge Headquarters at the Lake Lowell Unit and at kiosks at the most-used boat launches that access the Snake River Islands Unit, even though many visitors access the Refuge from other locations. Additional interpretive materials will be added and existing materials will be updated. Welcome and orientation/interpretive kiosks will be installed at the most-used visitor access points. Interpretive panels will be installed along existing and proposed trails to increase the audience for interpretive information. Appropriate electronic tools (e.g., Smartsigns to be used with cell phones to provide regulatory and interpretive information) will be implemented to provide land- and water-based interpretive opportunities.

To increase guided interpretive opportunities, staff-, volunteer-, or concessionaire-guided interpretive opportunities will be provided. Interpretive programs could include guided walks, on-water kayak/canoe trips, and guided walks at night or into closed areas. Guided walks/paddles could be on a variety of topics (e.g., eagle nesting, wintering waterfowl, songbird migration, nocturnal wildlife, grebes, and shorebirds). Both land- and water-based interpretive opportunities could better educate visitors about Refuge resources and recreational impacts on them.

Nature exploration areas provide opportunities for children to experience nature first-hand through unstructured outdoor play. Richard Louv identified the importance of first-hand unstructured experience in nature and the prevalence of "nature deficit disorder" as a serious issue in his book *Last Child in the Woods* (Louv 2005). Research supports Louv's arguments demonstrating that children's positive encounters with nature can lead to development of an environmental ethic (Chawla 1988; Palmberg and Kuru 2000; Wilson 1997).

Objective 2.4.1.3. Wildlife observation and photography

Provide quality wildlife and nature observation and photography opportunities for visitors of all ages and abilities on 13 miles of trail and 5 developed viewing facilities on the Refuge. Wildlife observation and photography programs will emphasize opportunities for casual visitors and beginning to moderate birders. Wildlife observation and photography programs will be characterized by:

- Occasional guided opportunities in otherwise-closed areas when that will allow visitors access to unique wildlife/habitat observation opportunities.
- Integration with the interpretive program to provide visitors opportunities to make discoveries.
- Consistency with quality criteria in Section 2.2.2.

Strategies Applied to Achieve Objective

See Objective 2.4.1.4 for boating regulations and rationale.

Allow walking access to Snake River Islands Unit for wildlife observation and photography from June 15 to January 31 on goose-nesting islands and from July 1 to January 31 on heron- and gull-nesting islands.

Implement seasonal closures, as follows, on the Snake River Islands Unit to prevent disturbance to waterfowl and colonial-nesting birds.

- All Refuge islands closed February 1 to June 14 during goose nesting season.
- *Some* Refuge islands closed February 1 to June 30 to reduce disturbance to colonial-nesting birds (e.g., herons, gulls, and terns currently nest on four to six islands).

Allow walking access, as follows, to Lake Lowell Unit for wildlife observation and photography:

- To protect nesting birds, allow access only on maintained roads and trails from February 1 to July 31 in the North Side and South Side Recreation Areas. During these months, lakeshore access is restricted to 100 meters on either side of trails accessing the lakeshore. Off-trail travel allowed August 1 to January 31.
- To protect wintering birds, access to Murphy's Neck through the walk-through on Orchard Avenue allowed only March 15 to September 30.
- In the East Side Recreation Area, off-trail travel allowed all year.
- In the Gotts Point area, off-trail travel allowed February 1 to September 30.
- Off-trail travel is allowed April 15 to September 30 in most of the Lower Dam Recreation Area. The wooded area west of Murphy's Neck is the exception, where off-trail travel is allowed August 1 to September 30 (see Maps 4-6).
- Off-trail travel may be restricted in areas that have been rehabilitated (e.g., after a fire) to allow time for plants to re-establish.

Implement land-based seasonal closures, as follows, on the Lake Lowell Unit to protect important wildlife areas. See Map 4.

- Protect all active and historical grebe nesting colonies by establishing an area up to 500-yards not open to public use during boating season. If there is no nesting in a colony by July 15 of the following year, the closure around that colony will be re-opened. Upland portions of the closures will be open to use from October 1 to January 31.
- Establish a buffer up to 300 yards around eagle nests from February 15 to July 15.
- Establish a seasonal closure buffer area around osprey nests up to 150 yards, from March 15 to August 1.
- Establish a buffer up to 250 yards around heron rookeries from February 1 to July 1.
- Establish a closure up to 100-yards around shorebird feeding and resting areas from July 15 to September 30 during years when the lake level elevation is lower than 2,522 feet.
- Continue wildlife closure at Gotts Point from October 1 to January 31.
- Establish wildlife closure at Murphy's Neck from October 1 to March 14 (see Map 4).
- Continue wildlife closure at Lower Dam Recreation Area from October 1 to April 14.

Consider whether and how to develop a walking trail in the South Side Recreation Area.

Maintain existing trails and develop new trails at appropriate locations to provide wildlife observation and photography opportunities. For example:

- Assess suitability for providing a 0.65-mile ABA-accessible interpretive loop trail in riparian habitat between Lower Dam Recreation Area and Murphy's Neck that will include access to shoreline fishing.
- Provide interpretive trail through restored native area at Lower Dam Recreation Area.
- Provide 0.6-mile bike/walking path from entrance to Visitor Center along entrance road to provide connectivity to possible bike paths.
- Provide 0.13-mile trail between loops of existing Observation Hill Trail System west of Visitor Center to provide a loop trail experience during eagle nesting season.
- Provide 0.63-mile trail or improved trail to the observation platform west of the Visitor Center from the entrance road parking lot.
- Provide a 1.5-mile self-guided or virtual geocaching on-water trail looping to the east from Parking Lot 1.

Maintain existing observation facilities (e.g., towers, platforms, blinds) and develop new at appropriate locations. For example:

- Provide multipurpose (e.g., fishing, observation) dock/platform at north end of Lower Dam Recreation Area near existing Environmental Education Building.
- Provide multipurpose (e.g., fishing, observation, hunting) dock at Parking Lot 1.
- Provide a seasonal shorebird observation/photography blind on the northern shoreline of the East Pool east of Tio Lane. Access by SUP. Implement fee for use comparable to fees at other refuges.
- Provide observation/photography blind at Upper Dam Marsh for reservation with SUP. Implement fee for use comparable to fees at other refuges.

Provide an ABA-accessible kayak/canoe launch at an appropriate location to access prime wildlife observation areas.

Maintain or provide remote observation opportunities through webcams, for example:

- Maintain existing osprey nest webcam.
- Install grebe, heron, or eagle nest webcam(s).

Rationale: Wildlife observation and photography, when compatible, are priority public uses of the NWRS. Many visitors to national wildlife refuges, including Deer Flat NWR, enjoy opportunities to watch and photograph wildlife. Scoping comments revealed a desire for additional trails and wildlife observation and photography facilities and programs. In addition, connecting people with nature is a priority for the Service and many other natural resource agencies interested in maintaining an active constituency. Providing accessible observation and photography opportunities will create greater visitor awareness and appreciation of the Refuge's purpose and its wildlife and habitat resources.

Although wildlife observation and photography can result in disturbance to wildlife, disturbance will be intermittent and short-term when activities are conducted according to the stipulations designated in the Compatibility Determination for Wildlife Observation, Photography, Interpretation, and Environmental Education (in Appendix B). Pedestrian travel will be restricted to established trails during the nesting season to increase predictability of public use patterns on the Refuge and thus allow nesting wildlife to habituate to nonthreatening activities. Year-round off-trail travel opportunities will be allowed in the East Side Recreation Area, which is less biologically sensitive than other areas of the Refuge. Providing seasonal closures around sensitive wildlife areas will reduce impacts to wildlife while providing recreational opportunities in these areas when the wildlife is less vulnerable.

To provide more observation and photography opportunities, new facilities are proposed, including trails that provide access to different habitats than existing trails provide and observation/photography blinds that provide access to areas with wildlife concentrations. New facilities will not be considered in upland areas that have been restored (the Sage Fire area northwest of the Visitor Center and the CC Lightning

Fire area east of Gotts Point) to provide sanctuary areas for wildlife and minimize introduction of invasive plants in restored areas.

A trail on the south side of the Refuge was suggested by several members of the public during the scoping period. Any ground-level trail in this area will be inundated by irrigation water for much of the winter, spring, and fall, causing major maintenance issues and unavailability to Refuge visitors. Because of these issues, any trail in the riparian zone on the south side of the Refuge will need to be elevated. Due to the projected cost for the 2-mile boardwalk between Parking Lots 1 and 3, it is not proposed; instead, the trail concept will be investigated further to determine if a lower-cost option is available.

Objective 2.4.1.4. Compatible nonwildlife-dependent public uses – Lake Lowell

Provide opportunities for visitors to enjoy water-based nonwildlife-dependent recreational activities (including motorized, wind-powered, and human-powered boating as well as tow-behind activities and swimming) at the Lake Lowell Unit on a variable* number of acres, including wake-causing activities on a variable number of acres. Provide two designated swim beaches. Provide opportunities to enjoy land-based, nonwildlife-dependent recreational activities (including horseback riding, jogging, and bicycling) on 8.75 miles of trails. The uses shall adhere to the following guidelines:

- Minimal disturbance to breeding and foraging wildlife.
- Minimal conflicts with wildlife-dependent recreationists.
- Consistent with quality criteria in Section 2.2.2.

*Areas critical to nesting birds (e.g., grebe colonies, heron rookeries, bald eagle nests) will be closed to public entry on a seasonal basis. These areas will be sized appropriately according to best available science. The area will remain closed until no nesting is observed within the same area the following year.

Strategies Applied to Achieve Objective

Nonwildlife-dependent motorized and nonmotorized boating will be allowed on Lake Lowell. No-wake zones, seasonal lake closures, and area closures will be applied to protect wildlife and reduce conflicts with wildlife-dependent recreational activities.

- Allow boating from April 15 to September 30 during daylight hours. Establish no-wake zone east from line between Parking Lot 1 and Gotts Point and within the Narrows
- Allow nonmotorized boating from October 1 to April 14 in Fishing Areas A and B (200 yards in front of the Upper and Lower Dams) during daylight hours.

To protect emergent beds for nesting grebes and other wildlife, institute appropriate seasonal closures. See Map 4.

- Protect emergent plant beds on the lake's south side with a 200-yard no-wake zone measured from the shoreline edge or emergent vegetation, whichever is closer to the center of the lake.
- Establish no-wake area in the Narrows between the east and west pools.
- Protect all active and historical grebe nesting colonies by establishing an area up to 500 yards not open to public use (Berg et al. 2004) during boating season. If there is no nesting in a colony by July 15 of the following year, the closure around that colony will be reopened. Upland portions of the closures will be open to use from October 1 through January 31.

To protect sensitive nesting habitat, institute appropriate seasonal closures. See Map 4.

- Up to a 300-yard seasonal closure around eagle nests (Anthony et al. 1995) from February 15 to July 15.
- Up to a 150-yard seasonal closure around osprey nests from March 15 to August 1.
- Up to a 250-yard seasonal closure around heron rookeries (Vos et al. 1985) from February 1 to July 1.

To protect mudflat habitat and migrating shorebirds, institute up to a 100-yard seasonal closure around sensitive shorebird areas (Rodgers and Smith 1997) from July 15 to September 30 when the water elevation level falls below 2,522 feet. See Map 4.

Allow tow-behind activities (e.g., waterskiing, wakeboarding) in areas open to wake activities.
Allow sailing regattas in April and May. All no-wake zones and area closures must be followed. Sailing regattas only allowed every other weekend (to provide opportunities for other users). All regattas must launch from the Lower Dam Recreation Area. Fee of $100, with 25-boat limit. See the Compatibility Determination for Sailing Regattas in Appendix B for other stipulations.
Prohibit boaters from anchoring or pulling onto land adjacent to closed areas.
To minimize noise disturbance to wildlife, enforce Idaho State noise ordinances on Lake Lowell.
To minimize negative impacts to water quality, promote the use of CARB star-rated motors at the level of two stars and above.
Allow kiteboarders and windsurfers to launch from any open shoreline and require compliance with speed limit in no-wake zones.
Allow swimming as follows: • From April 15 to September 30 direct swimmers to designated swim beaches at the Upper Dam east-side boat launch and at Lower Dam Recreation Area in a buoyed area closed to boating and monitored for water quality effects to human health. • Shoreline swimming will be allowed in designated areas and elsewhere, except for around fishing or other wildlife-dependent facilities (e.g., docks), or immediately adjacent to boat launch areas. • Swimming will be allowed from boats, in the open waters of Lake Lowell outside no-wake zones.
To protect important wildlife areas, implement land-based seasonal closures surrounding important wildlife areas. See Objective 2.4.1.3.
Allow horseback riding access to Lake Lowell Unit for wildlife observation and photography on designated multi-use trails (see Maps 4-6).
Require equestrian groups of more than 10 horses and riders to obtain an SUP.
Allow walking with on-leash pets on designated multi-use trails (see Maps 4-6), maintained roads, and in the Lower Dam Recreation Area, with a requirement for removal of pet feces.
Provide pet waste removal stations at the Visitor Center, Gotts Point, and Tio Lane access points.
Allow jogging and bicycling on designated multi-use trails and maintained roads, and on the proposed trail adjacent to the entrance road.
Require groups of more than 10 joggers or bicyclists to obtain an SUP.
Allow picnicking in designated areas at the east end of Upper Dam and at Lower Dam Recreation Area. Because of the potential for injury of visitors, prohibit glass containers on the Refuge.
Rationale: **Boating at Lake Lowell Unit:** Providing opportunities for priority wildlife-dependent recreational activities is in keeping with provisions under the NWRS Administration Act as amended in 1997. Although boating itself is not a wildlife-dependent recreational activity, many wildlife-dependent activities like fishing and wildlife observation are enhanced by boating. Boating can negatively impact wildlife (see the Compatibility Determination for Recreational Boating in Appendix B). To reduce impacts of boating activity on wildlife and habitat, seasonal closures or no-wake zones will be implemented around important wildlife areas, such as eagle nests, grebe colonies, osprey nests, heron rookeries, and shorebird feeding areas. Although most literature recommends disturbance buffers from 400 yards to 1,500 yards for osprey, the Colorado Division of Wildlife (2008) and Van Daele and Van Daele (1982) suggest that some osprey populations are tolerant of human activity in the vicinity of their nests. Ospreys currently nesting at the Refuge seem to tolerate the 150-yard distance to the highly used Visitor Center. The use of a 150-yard nesting closure will be assessed during the life of the plan and changed to more closely meet the distances cited in scientific literature, if needed. Implementing these restrictions, as well as the boating closure from October 1 to April 14, will provide adequate habitat for migratory birds.

The West Pool and western portion of the East Pool will continue to allow wake boating activities and be managed for a safe, multiuse experience. The east end of the East Pool will be managed for wildlife-dependent activities (especially fishing, wildlife observation, and wildlife photography) using watercraft at no-wake speeds to provide a quality experience with minimal impact to wildlife and other users.

Boating capacity decisions will be made with the Canyon County Marine Patrol and other boating management experts. These decisions will be used in site planning and in determining the number of designated boat trailer parking spots to provide at launches. To prevent an excess of boat trailer parking, the Refuge will work with Reclamation to manage overflow parking at the east side of the Upper Dam to improve safety and reduce congestion at the boat ramp and on the lake.

Nonwildlife-dependent boating visitors provide the Refuge opportunity to reach out to nontraditional user groups and to encourage boating users to observe wildlife and learn about the NWRS. Due to the close proximity of the Refuge to the cities of Nampa and Caldwell, the number and variety of users to this urban refuge is expected to grow. For many of these people, boating at Lake Lowell may provide an introduction to a national wildlife refuge.

Swimming at Lake Lowell Unit: Although not a priority general public use as determined by the NWRS Improvement Act of 1997, compatible nonwildlife-dependent beach use at Deer Flat NWR is popular. There have been several near-drowning incidents at Lake Lowell in the past few years, and one fatality (one swimming fatality occurred in 2011); therefore, we hope that encouraging shoreline swimmers to use two designated swimming areas that are easily accessible to rescue personnel will help minimize safety issues. There will be no lifeguards stationed at the swimming areas. If swimming is managed according to the stipulations in the Compatibility Determination for Swimming, Beach Use, and Picnicking (including Lower Dam Recreation Area) in Appendix B, visitors can enjoy the chance to relax on the shores of Lake Lowell. Although their primary activities may be swimming, sunbathing, reading, or relaxing, this activity could result in wildlife observation opportunities as well. For many visitors, swimming and beach use at Lake Lowell may provide an introduction to a national wildlife refuge.

There is currently human health and safety concerns related to swimmers in Lake Lowell during certain conditions, including when blue-green algae blooms occur, when swimmer's itch is reported, and when fecal coliform levels exceed State health standards. The Refuge will work with IDEQ and Southwest District Health (SDH) to monitor water quality, and if necessary, close the swimming areas. When water quality testing at the swimming areas indicates health concerns, testing will also be conducted at other lake sites. The Refuge will work with IDEQ and SDH to establish water contact warnings and closures at these locations, when warranted.

Upland nonwildlife-dependent uses: Visitors will be allowed to walk with their pets in accordance with the stipulations in the Compatibility Determination for Walking with Pets in Appendix B, including restricting leashed pets to designated trails and the Lower Dam Recreation Area, and requiring removal of pet waste. Keeping pets on designated trails will allow wildlife-dependent visitors the opportunity to use several trails without having to interact with pets.

Horseback riding, jogging, and bicycling are not wildlife-dependent public uses of the Refuge, as defined by statute (16 U.S.C. 668dd et seq.). However, these uses of the existing trails are potential modes for wildlife-dependent uses and are expected to result in only minor additional impacts to wildlife. Restricting the disturbance to an established trail will increase predictability of public use patterns on the Refuge, allowing wildlife to habituate to nonthreatening activities (see the Compatibility Determination for Horseback Riding, Jogging and Bicycling in Appendix B). Groups of more than 10 horses and riders will be required to obtain an SUP, because large groups may restrict use for other wildlife-dependent users due to the limited space both on trails and in parking lots.

To reduce impacts to visitors engaging in wildlife-dependent activities, especially those involved in EE and interpretive programs, pets, horses, and bikes will not be allowed on the Nature, Centennial, Murphy's Neck, or Boardwalk Trails (for more information on trails, see Chapter 5). These trails are, for the most part, narrower than the patrol road trails (East Dike, Kingfisher, Gotts Point, and Observation Hill Trail System) and therefore do not lend themselves to multiple uses. The Centennial and Nature Trails are currently used for EE and interpretive programs. To reduce disturbance to these programs, increase the safety of the visiting public, and provide adequate space for multiple-use activities, on-leash pets, horses, and bikes will be allowed only on the entrance road, the East Dike, Kingfisher, and Gotts Point Trails, and the Observation Hill Trail System. Leashed pets will also be allowed in the Lower Dam Recreation Area. Off-leash dogs have been reported fighting in public use areas. Off-leash pets increase the potential for visitor injury through biting incidents or trampling of children. To address comments regarding pet feces on trails, visitors walking pets will be required to pick up after their pets.

Visiting with pets, horseback riding, jogging, and bicycling provide opportunities for the Refuge to reach out to nontraditional user groups to encourage them to observe wildlife and learn about the NWRS. Due to its close proximity to the cities of Nampa and Caldwell, the number and variety of users to this urban refuge is expected to grow. For many of these people, multiple-use trails may provide an introduction to a national wildlife refuge.

Picnicking will be allowed only in designated areas at the east end of the Upper Dam and at the Lower Dam Recreation Area to reduce the potential for conflict with wildlife-dependent activities (e.g., fishing, wildlife observation, wildlife photography).

2.4.2 Goal 2 (Hunting): Hunters of all ages and abilities will enjoy a family-friendly, safe, quality hunt that minimally impacts Refuge habitats and wildlife and increases their understanding and appreciation of the importance of Deer Flat NWR as wildlife habitat

Objective 2.4.2.1. Hunting waterfowl

Provide a quality, safe waterfowl hunt program on 2,250 acres of the Lake Lowell Unit and 1,219 acres of the Snake River Islands Unit capable of supporting about 5,000 hunter visits per season. Hunt programs will include opportunities for youth hunting and hunters with disabilities. Hunts will be characterized by:

- Close cooperation and coordination with IDFG and ODFW for management of hunting opportunities on the Refuge and in setting population management goals and objectives.
- To the extent practicable, consistency in Refuge hunting regulations with IDFG and ODFW fish and wildlife laws and regulations.
- Increased opportunities while maintaining hunt quality.
- Reliable/reasonable opportunities to experience a successful waterfowl hunt.
- ABA compliance.
- Consistency with quality criteria in Section 2.2.2.

Strategies Applied to Achieve Objective

Allow waterfowl hunting on all islands in the Snake River Islands Unit.

Allow waterfowl hunting at the Lake Lowell Unit (see Map 4) as follows:

- Waterfowl hunting allowed between Parking Lots 1 and 8. Hunting allowed from an electric- or human-powered boat within 200 yards of the shoreline of hunt zones on the south side of the lake.
- Walk-in waterfowl hunting allowed from the east boundary of the Leavitt Tract west to the Greenhurst Road entrance at Gotts Point.

Prohibit waterfowl hunting on foot from the ice on the Lake Lowell Unit.

During waterfowl hunting season, allow public use activities in all waterfowl hunting areas.
Post signs at Refuge access points to notify Refuge users when a hunt is underway.
Take measures to improve goose nesting success on Snake River Islands Unit (e.g., implement predator control measures, shorten the end of waterfowl hunt season, or implement habitat restoration) if shown to be necessary by goose nesting analysis/study.
Allow use of dogs for waterfowl hunting. Require dogs to be leashed unless actively hunting and remain under strict voice control at all times.
Provide youth waterfowl hunt in accordance with IDFG regulations in all designated waterfowl hunt zones. Allow hunting from an electric- or human-powered boat within 200 yards of the shoreline of hunt zones on the south side of the lake.
Evaluate whether to charge a hunt fee and/or institute a more structured hunt opportunity.
Provide ABA-compliant hunting blind at appropriate location(s) available to parties with at least one hunter with an IDFG-issued disabled hunt license.
Establish daily limit of 25 shotgun shells in possession per hunter on Lake Lowell Unit.
Rationale: Hunting, when compatible, is identified as one of the priority recreational uses of the NWRS. Waterfowl hunting is compatible at the Refuge and will continue to be allowed. Current hunters report that the Lake Lowell Unit provides a unique hunting opportunity for southwest Idaho when the riparian zone is flooded because hunters can jump shoot ducks in the wooded areas. At the Lake Lowell Unit, waterfowl hunters seem to view hunting from Parking Lots 5 through 7 as a higher-quality hunting opportunity. To improve safety and minimize conflict with other priority uses, signs will be posted at Refuge access points to notify Refuge users when a hunt is underway. Refuge staff will evaluate whether to charge a fee and/or institute a more structured hunt opportunity to address complaints about limited access. We considered but rejected the possibility of a controlled hunt with blinds because it will require too much management, due to the fluctuating water levels at Lake Lowell. There will be a limit of 25-shotgun shells in possession per hunter to address complaints about sky busting. Sky busting is a term used by waterfowl hunters to describe the act of shooting at waterfowl that are too high overhead to be within effective range of a shotgun. In an area like Lake Lowell where hunters are relatively close together, sky busting is a nuisance because it deters waterfowl from coming into a decoy spread where close, ethical shots can be achieved. There is concern that sky busting decreases the probability of making a clean kill and/or recovery of a wounded bird after being hit from a long distance. According to the IDFG 2009 Progress Report for Waterfowl Fall and Winter Surveys, Production, Summer Banding and Harvest, the three-year average for breeding pairs in the Snake River/Payette River survey area was below the minimum goal for the fifth consecutive year (IDFG 2009a). Analyzing the possible reasons for this discrepancy may lead to several possible solutions to increase the number of breeding pairs in the area. The Refuge hopes to work closely with IDFG to determine and implement possible solutions. Some solutions may include predator control efforts, habitat restoration, and/or shortening of the hunting season to reduce the impact to breeding pairs.

Objective 2.4.2.2. Hunting upland game
Provide a quality, safe upland game hunt program on 2,250 acres of the Lake Lowell Unit and 1,219 acres of the Snake River Islands Unit, capable of supporting about 1,100 hunter visits per season. Hunt programs will include opportunities for disabled hunters. The hunt will be characterized by: • No stocking of nonnative game. • Close cooperation and coordination with IDFG and ODFW for management of hunting opportunities on the Refuge and in setting population management goals and objectives.

- To the extent practicable, consistency of Refuge hunting regulations with IDFG and ODFW fish and wildlife laws and regulations.
- Reliable/reasonable opportunities to experience a successful upland game hunt.
- As possible, upland hunting opportunity for mobility-impaired hunters.
- Consistency with quality criteria in Section 2.2.2.

Strategies Applied to Achieve Objective

Allow upland game hunting on the Snake River Islands Unit.

Allow upland bird hunting at the Lake Lowell Unit from the east boundary of the Leavitt Tract west to the Greenhurst Road entrance at Gotts Point and between Parking Lots 1 and 8.

During upland hunting season:

- Allow public use activities in all upland hunting areas.
- Post signs at Refuge access points to notify Refuge users when a hunt is underway.

Allow use of dogs for upland hunting. Require dogs to be leashed, unless actively hunting, and to remain under strict voice control at all times.

Evaluate whether to implement restricted hunting hours to reduce conflicts with waterfowl hunters.

Rationale: Hunting, when compatible, is one of the priority recreational uses of the NWRS. Upland hunting will continue to be allowed. Hunting is provided for existing naturalized populations of nonnative upland game birds (e.g., ring-necked pheasant, California quail). These populations will not be supplemented, and no habitat management will be performed solely for the benefit of these species.

To improve safety and minimize conflict with other priority uses, signs will be posted at Refuge access points to notify Refuge users when a hunt is underway. Refuge staff will evaluate whether to implement restricted hunting hours to reduce conflicts with waterfowl hunters. If upland hunters reduce the quality of the waterfowl hunt, a start time of 10 AM for upland hunting may be imposed.

Objective 2.4.2.3. Hunting deer on the Snake River Islands Unit

Provide and promote quality, safe deer hunt on 1,219 acres of the Snake River Islands Unit of the Refuge capable of supporting about 75 hunter visits per season. The hunt will be characterized by:

- Close cooperation and coordination with IDFG and ODFW for management of hunting opportunities on the Refuge and in setting population management goals and objectives.
- To the extent practicable, consistency of Refuge hunting regulations with IDFG and ODFW fish and wildlife laws and regulations.
- Reliable/reasonable opportunities to experience a successful deer hunt.
- Consistency with quality criteria in Section 2.2.2. Deer Hunting at Lake Lowell Unit.

Strategies Applied to Achieve Objective

Allow deer hunting on the Snake River Islands Unit.

Prohibit use of lead buckshot.

Rationale: Hunting, when compatible, is identified as one of the priority recreational uses of the NWRS. A deer hunt will therefore continue to be provided at the Snake River Islands Unit. Lead buckshot is prohibited to reduce consumption of lead shot by target and nontarget species.

2.4.3 Goal 3 (Fishing): Anglers will enjoy a family-friendly, quality, accessible fishing opportunity that minimally impacts Refuge habitats and wildlife and increases their understanding and appreciation of the importance of Deer Flat NWR as wildlife habitat

Objective 2.4.3.1. Provide quality fishing opportunities

Provide quality shoreline and boat fishing opportunities at Lake Lowell aimed at providing successful fishing for beginning, casual, and local anglers on a variable number of acres* of the Lake Lowell Unit and 66 miles of shoreline at the Snake River Islands Unit. Together, these areas are capable of supporting about 45,300 angler visits per season. Fishing programs will include youth event(s) and opportunities for disabled anglers. The fishing opportunity will be characterized by:

- Close cooperation and coordination with IDFG and ODFW for management of fishing opportunities on the Refuge and in setting population management goals and objectives.
- Stocking of the following species by IDFG as appropriate to provide a quality fishery: black crappie, bluegill, channel catfish, Lahontan cutthroat trout, largemouth bass, yellow perch, rainbow trout, and smallmouth bass.
- To the extent practicable, consistency of Refuge fishing regulations with IDFG and ODFW fish and wildlife laws and regulations.
- Minimal disturbance from artificial noise.
- ABA-compliant accessibility.
- Consistency with quality criteria in Section 2.2.2.

*** A**reas critical to nesting birds (e.g., grebe colonies, heron rookeries, bald eagle nests) will be closed to public entry on a seasonal basis. These areas will be sized appropriately according to best available science. The area will remain closed until no nesting is observed in the same area the following year.

Strategies Applied to Achieve Objective

Implement seasonal closures on Snake River Islands Unit to prevent disturbance to waterfowl and colonial-nesting birds as follows:

- All Refuge islands closed February 1 to June 14 during goose nesting season.
- Some Refuge islands - closed February 1 to July 1 to reduce disturbance to colonial-nesting birds (e.g., herons, gulls, and terns are currently nesting on four to six islands).

Apply boating regulations and facilities described in Objective 2.4.1.4 for Lake Lowell Unit, to float tubes used for fishing.

Allow wading access to fishing anywhere at Lake Lowell Unit from April 15 to September 30 and all year in Fishing Areas A and B.

Allow access to bank fishing at Lake Lowell Unit as follows:

- To protect nesting birds, access only on maintained roads and trails from February 1 to July 31 in the North Side and South Side Recreation Areas. During these months, lakeshore access is restricted to 100 yards of shoreline on either side of trails accessing the lakeshore. Off-trail travel allowed August 1 to January 31.
- To protect wintering birds, access to Murphy's Neck through the walk-through on Orchard Avenue allowed from March 15 to September 30.
- In the East Side Recreation Area, off-trail travel allowed all year.
- In the Gotts Point area, off-trail travel allowed February 1 to September 30.
- In areas accessed through the Lower Dam Recreation Area, off-trail travel is allowed April 15-September 30.
- During waterfowl hunting season from any open shoreline.
- Implement seasonal closures surrounding important wildlife areas (eagle nests, grebe colonies, osprey nests, heron rookeries, and shorebird feeding and resting areas). See Objective 2.4.1.3.

• Implement land-based seasonal closures on the Lake Lowell Unit to protect important wildlife areas. See Map 4. • Protect all active and historical grebe nesting colonies by establishing an area of up to 500 yards not open to public use during boating season. If there is no nesting in a colony by July 15 of the following year, the closure around that colony will be reopened. Upland portions of the closures will be open to use from October 1 to January 31. • Establish a buffer of up to 300 yards around eagle nests from February 15 to July 15. • Establish a seasonal closure of up to 150 yards around osprey nests from March 15 to August 1. • Establish a buffer of up to 250 yards around heron rookeries from February 1 to July 1. • Establish a closure up to 100 yards around shorebird feeding and resting areas from July 15 to September 30 during years when the lake level elevation is lower than 2,522 feet. • Continue wildlife closure at Gotts Point from October 1 to January 31. • Establish wildlife closure at Murphy's Neck from October 1 to March 14. • Continue wildlife closure at Lower Dam Recreation Area from October 1 to April 14.
Provide access at Gotts Point as follows: • Fully open Gotts Point to vehicle access upon completion of memorandum of understanding or cooperative agreement with Canyon County to resolve law-enforcement issues. • Provide designated fishing ABA-accessible trails from parking areas at Gotts Point. • Provide ABA-accessible dock at Gotts Point.
Ice fishing allowed in Fishing Areas A and B within 200 yards of the dams, subject to areas posted by Reclamation.
Develop new trails to access the lake for fishing at appropriate locations, for example: • At Parking Lots 4 and 7 • At Parking Lots 2 and 3 • From 0.65-mile ABA-accessible interpretive loop trail in riparian habitat between Lower Dam Recreation Area and Murphy's Neck if that trail is installed.
Fishing access to Murphy's Neck may be moved if Murphy's Neck trail is installed (Objective 2.4.1.3).
Provide multipurpose (e.g., fishing, observation) docks or platforms at appropriate locations, such as: • At north end of Lower Dam Recreation Area near existing Environmental Education Building. • Just west of boat launch at east end of the Upper Dam. • Multipurpose (e.g., fishing, observation, hunting) dock at Parking Lot 1.
Allow fishing tournaments at Lake Lowell as follows: • During boating season except May 14 to July 9. All no-wake zones, area closures, and State fishing regulations must be followed (exception to catch and release with permission from IDFG before the end of June). Bass tournaments only allowed every other weekend (to provide opportunities for nontournament anglers). All bass tournaments must launch from the Lower Dam Recreation Area. Fee of $100, with 100-boat limit.
Prohibit live, nonnative aquatic bait per Service policy (605 FW 3).
Provide fishing line receptacles.
Coordinate with the Board of Control and IDFG to increase bottom structure to benefit fish that does not interfere with the irrigation purpose of the reservoir.
Coordinate with IDFG on the stocking of the following fish species at the Lake Lowell Unit: largemouth bass, smallmouth bass, bluegill, channel catfish, black crappie, yellow perch, rainbow trout, and Lahontan cutthroat trout. Stocking of any other fish species will require additional planning.
Develop a cooperative agreement with IDFG for resident fish and wildlife management.
Rationale: Fishing, when compatible, is identified as one of the priority recreational uses of the NWRS. Fishing attracts visitors to the Refuge and often enhances their appreciation of natural resources. Fishing will, therefore, continue to be provided at the Snake River Islands and Lake Lowell Units.

Currently, Refuge anglers complain about a reduced-quality fishing experience because of conflict with nonwildlife-dependent recreationists on the lake, limited bank- and dock-fishing, and difficulty in accessing bank-fishing opportunities. In a 2006 Idaho Angler Opinion Survey conducted by IDFG, most respondents were anglers who fished from the bank (IDFG 2007). Additional trails and docks will be provided to facilitate shoreline access and fishing. Improved facilities will mitigate negative impacts associated with concentrated shoreline fishing. These facilities will also concentrate use and thus reduce the footprint of deleterious impacts. Fishing line can injure or kill birds and other wildlife, so fishing line receptacles will be provided at major fishing access points.

Safety is a major concern for recreational users who rely on the structural integrity of the ice on Lake Lowell to enjoy their sport. According to the National Weather Service (accessed online at http://www.rssweather.com/climate/Idaho/Boise/), average monthly high temperatures in the Treasure Valley do not reach freezing levels. This, combined with high winds and long fetch, makes the freezing of the water on Lake Lowell very unpredictable, and any frozen areas of the lake unsafe. Systematic ice evaluations by qualified personnel are not conducted. However, ice fishing will be allowed to provide a quality fishing opportunity during years when ice conditions are favorable.

Ice fishing will be allowed in Fishing Areas A and B within 200 yards of the dams, subject to areas posted by Reclamation. The lake is closed to boating October 1 through April 14, and restricting ice-fishing access to these areas will reduce disturbance from human-caused flushing events. Anglers will be responsible for confirming that ice conditions are safe.

To provide safer access to a popular spring fishing area, walk-through access to Murphy's Neck may be removed after installation of the proposed 0.65-mile ABA-accessible interpretive Murphy's Neck loop trail and additional shoreline access trails.

The majority of the road to Gotts Point was closed to vehicles in 2007 after years of persistent law enforcement issues. The road to Gotts Point will be reopened upon completion of an MOU with Canyon County to formalize agreements about law enforcement and maintenance.

Refuge staff will monitor angling activities on the Refuge and apply adaptive management as issues arise. Monitoring efforts will be a part of an overall fisheries management plan that will help guide fisheries management into the future.

2.4.4 Goal 4 (Environmental Education): Students, teachers, and Refuge visitors will understand the biology and management of the Refuge and the mission of the National Wildlife Refuge System and will demonstrate stewardship of the Refuge and other wildlife habitats

Objective 2.4.4.1. Environmental education

Provide quality EE opportunities for 9,400 students aligned with grade-specific State curriculum standards. On-site and teacher-led programs will be emphasized over off-site programs. As a result of participating in Refuge EE programs, students will show an 80 percent increase in understanding about the topic presented, as measured by pre- and post-tests. EE programs will be characterized by:

- Techniques to reach students with a variety of learning styles.
- Emphasis on enjoyable, hands-on, inquiry-based learning.
- Maximum 10:1 student-to-adult ratio during field trips.
- Use of only local examples of flora and fauna.
- Appropriate facilities.

- Positive teacher feedback.
- Consistency with quality criteria in Section 2.2.2.

Strategies Applied to Achieve Objective

Within two years, meet with teachers and school districts (especially Caldwell, Nampa, and Vallivue) to determine which themes and age groups to target and to refine the Refuge's scope of EE programming to that best suited for Refuge field trips and traveling trunks. Eliminate EE programming that is better suited to other educational venues or that is delivered at other local educational sites.

Within seven years, develop EE curricula to be used with teacher-led classes and Refuge-specific instructor training for teachers ("teach the teacher" programs). Enlist local teachers to help develop curricula to ensure that educational requirements are met. After programs are developed, offer at least two teacher training workshops annually and establish a program to encourage and select trained teachers to use the Refuge's facilities, curricula, and programs for teacher-led EE. By the end of 15 years, teachers will lead 75 percent of educational visits.

Within two years, modify existing EE programs not targeted at school classrooms/field trips (e.g., day camps, Scout Day, Youth Conservation Corps) to be consistent with EE themes. Eliminate EE programs better suited to other educational venues or delivered at other local educational sites.

Provide at least 2 EE study sites for 25 students in areas that facilitate EE programs on designated themes. This might include a portable learning lab (i.e., a trailer).

Rationale: Environmental education, when compatible, is a priority public use of the NWRS and can be used to educate visitors and residents of local communities about natural resources, refuges, and the NWRS, as well as their role in wildlife conservation and how their compliance with Refuge rules and regulations can help solve or prevent management problems. EE will continue to be provided, however, the Refuge expects a wider range of user groups, and interpretation has greater flexibility to reach broader audiences. Therefore, interpretation will be emphasized over EE. Existing EE programs (e.g., Scout Day, day camps, off-site programs, and the on-site Discover Wildlife Journeys program) may be reduced or restructured to allow enough staff and volunteer time to provide for increased on-site interpretation.

Refuge staff will work with teachers and school districts (especially Caldwell, Nampa, and Vallivue) to determine which themes and age groups to target and to refine the Refuge's scope of EE programming to that best suited for Refuge field trips and traveling trunks. EE programming delivered at other local educational sites will be eliminated. Refuge EE staff will consider Idaho's Environmental Literacy Plan (Fletcher 2011).

EE themes will focus on increasing awareness and understanding of the Refuge and NWRS, of how to be a better Refuge visitor, and of issues facing the Refuge and its wildlife and habitat. Possible themes will include:

- What is a national wildlife refuge? What is the Refuge's purpose?
- The North American model of wildlife management.
- The role of Lake Lowell in irrigation.
- How visitors can help conserve the Refuge and other wildlife habitats.
- Water quality, water conservation, and watersheds.
- Invasive species (e.g., carp, plants, domesticated animals, aquatics).
- Migration (e.g., waterfowl, neotropical migrants).
- Individual wildlife species (e.g., waterfowl, grebe) and their habitat requirements.
- Urbanization impacts.

On-site EE programs will be prioritized over off-site programming, because higher-quality experiences are possible during an on-site field trip. When programs are conducted off-site, requests from Canyon and Owyhee counties will be top priority because they are closer to the Lake Lowell Unit where Refuge staff

members are stationed. Requests from Ada, Payette, and Washington counties in Idaho, and Malheur County in Oregon will be second priority. Even though the Snake River Islands Unit falls within Payette, Washington, and Malheur counties, the distance from Refuge Headquarters makes it less feasible to fulfill requests from these areas. The Refuge does not fall within Ada County and many other EE opportunities are based there, therefore, requests from Ada County will not be a top priority.

The Refuge will emphasize teach the teacher programs because this approach has the potential to both expand the potential number of students served and to broaden the base of knowledgeable EE instructors in the community. Indirectly, this might have the effect of broadening support for the Refuge within the local community. Because it takes time for teachers to receive training and become comfortable with the educational materials and familiar with the Refuge, there will be slow but gradual movement toward 75 percent of on-site programs being led by teachers over the life of the CCP.

EE study sites will be constructed; these structures will provide covered areas for students to gather during EE programs. Currently, students have no cover from weather during the outdoor portions of field trips. Because field trips are scheduled mostly in the spring and fall, weather can span the extremes of intense sunshine and pouring rain.

2.4.5 Goal 5 (Law Enforcement): Visitors will have limited impacts to wildlife, feel safe during their visit, and understand Refuge regulations and how they help protect wildlife and wildlife habitat as well as other visitors

Objective 2.4.5.1 Provide safe public use opportunities
Reduce illegal activities (e.g., trespass into closed areas, pets off leash, vandalism, trash dumping) by 10 percent per year from previous year.
Strategies Applied to Achieve Objective
Use variety of techniques to educate Refuge users about Refuge regulations and deter illegal public uses (e.g., brochures, leaflets, signage, news releases, and increased law enforcement patrols).
Pursue MOU with County Sheriff to patrol Gotts Point and Lower Dam Recreation Area; on-water, enforce existing State decibel limits.
Pursue codification of Refuge regulations with County Sheriff or creating a joint jurisdiction agreement.
Meet annually to educate County Sheriff's deputies on Refuge regulations and purposes, as well as other appropriate issues.
For both Refuge management and law enforcement officer(s), work with partners to facilitate safe public use opportunities, such as: • Meet with IDFG Conservation Officers annually to discuss law enforcement needs, issues, and opportunities to partner. • Coordinate with local emergency response entities for search and rescue. • Create a "neighborhood watch" for the Refuge in which Refuge neighbors notify Refuge staff about illegal activities.
Rationale: Reducing illegal activities that cause wildlife disturbance, trash issues, and safety concerns is a priority. Because of illegal activities, Refuge visitors and staff do not always feel safe everywhere on the Refuge. Eliminating illegal uses, defining access routes, restoring habitat, and promoting a sense of community pride in the Refuge will all be necessary for the Lake Lowell Unit to serve as high-quality wildlife habitat and for the public to feel safe using the site for priority public uses. To succeed in this endeavor, the Refuge will partner with others who can enforce Refuge regulations, use positively worded signs, explain the rationale behind regulations in brochures, signs, and interpretive talks; and install infrastructure that will help reduce illegal activities (e.g., lights and automatic gates).

Many comments were provided during the scoping period about visitors not following regulations, so the Refuge will investigate technologies that may reduce the likelihood of illegal activity. Remote video cameras and electronic gates may allow the Refuge to decrease illegal activities, increase the Refuge's ability to catch those engaged in illegal activities, and provide unobstructed use of the Refuge during daylight hours.

2.4.6 Goal 6 (Volunteers and Partners): The Refuge will initiate and nurture relationships and develop cooperative opportunities to nurture stewardship of the Refuge and instill in others an understanding and appreciation of the importance of Deer Flat NWR as wildlife habitat

Objective 2.4.6.1. Volunteers

Recruit, train, use, and retain volunteers for support of Refuge programs and activities.

- Annually recruit new volunteers to replace volunteers lost through attrition.
- Orient and train 30 new and returning volunteers annually
- Use and retain volunteers so that within three years, the number of volunteers that provide 10 or more hours of service exceeds 100 annually

Strategies Applied to Achieve Objective

Offer at least 5 volunteer orientation, refresher, and training sessions annually.

Hold at least 2 volunteer appreciation events annually.

Hold at least 3 community work days annually.

Maintain at least 8 trained EE volunteers annually.

Rationale: In FY11, more than 550 people volunteered at the Refuge, serving more than 11,000 hours by removing noxious weeds and litter, assisting with EE programs and special events, and conducting wildlife surveys. However, most of the volunteers participated on a one-time basis; in FY11, just 66 of the 550 volunteers contributed more than 10 hours each. These repeat volunteers have excellent knowledge of the Refuge and its resources, and they often add value to programs by working on more than one project and better knowing the resource. Increasing this core of dedicated repeat volunteers will provide benefits to both habitat management and public use programs. Increasing local residents' participation in even one-time activities will increase awareness of and support for the Refuge and its programs.

Objective 2.4.6.2. Partners and Friends

Maintain and enhance one or more partnerships within each of the following themes to increase partner knowledge of Refuge purposes and leverage resources to increase the effectiveness of Refuge programs.

- EE and interpretation
- Fishing
- Hunting
- Photography and wildlife observation
- Compatible nonwildlife-dependent surface-water recreation
- Water quality
- Urbanization and agriculture
- Invasive species

Strategies Applied to Achieve Objective

Work with the Friends of Deer Flat NWR board on development, member recruitment, and involvement.

Work with partners to facilitate EE and interpretive opportunities such as:

- Caldwell, Nampa, and Vallivue School Districts to develop educational programming for multiple disciplines and grade levels to maximize the Refuge as an educational resource.

- Colleges that identify use of the Refuge as a research, field lab, or service learning opportunity.
- Caldwell YMCA to create programs for a proposed day camp.
- The Friends group and community partners to create a community-wide Refuge event (like Snake River Days).
- Partner with Be Outside, Idaho, and other efforts to connect people with nature.
- Partner with Snake River Canyon Scenic Byway to post interpretive signs at the Lake Lowell and Snake River Island Units.
- Partner with Snake River Water Trail to post interpretive signs at the Snake River Island Unit.

Work with partners to facilitate wildlife observation and photography opportunities such as:

- Partner with Idaho Watchable Wildlife Committee and Idaho Birding Trail to promote and enhance wildlife observation and photography opportunities.
- Work with partners to host photography workshops.
- Partner with Canyon County and the cities of Caldwell and Nampa to connect their bike and pathways plans to Refuge facilities.

For Refuge management, work with partners to facilitate fishing opportunities such as:

- Work with partners to provide fishing workshops that target new or novice anglers.
- Work with partners to provide and promote fishing events for youth (e.g., Kids' Fishing Day).
- Work with partners to provide fishing events that encourage participation by disabled visitors.

Seek partnerships with State and private groups for funding and publication of tear sheets (e.g., for fishing, hunting, wildlife observation, and photography).

For Refuge management, work with partners to facilitate wildlife and habitat objectives such as:

- Work with IDFG and others to develop/implement methods to reduce Lake Lowell's carp biomass.
- Work with partners to obtain funding for a feasibility study to identify the best methods for improving the water quality (e.g., reducing phosphorus and silt) of Lake Lowell.
- Work with partners and volunteers to control the spread of weeds.
- Work with adjacent landowners to address cattle trespass problems in targeted locations on the Snake River Islands Unit.
- Work with partners and volunteers to install and maintain wildlife nesting structures (e.g., goose nesting platforms, wood duck boxes).
- Work with a local nursery to propagate harvested seed for restoration.

Rationale: Partnerships are key to the successful management of public lands and vital to implementation of the Refuge's programs, plans, and projects, especially in times of declining budgets.

2.4.7 Goal 7 (Cultural Resources): The Refuge will protect and manage its cultural resources and look for ways to gain new understanding of the history and cultural resources of both the Lake Lowell and the Snake River Islands Units

Objective 2.4.7.1. Inventory, evaluate, monitor, and protect the Refuge's cultural resources

Work with Service Cultural Resources staff and interested Tribes to identify, protect, and enhance the Refuge's cultural resources.

Strategies Applied to Achieve Objective

Develop systematic cultural resource inventory and monitoring plan consistent with Section 110 of the National Historic Preservation Act.

Identify any resources for potential inclusion in the National Register of Historic Places.

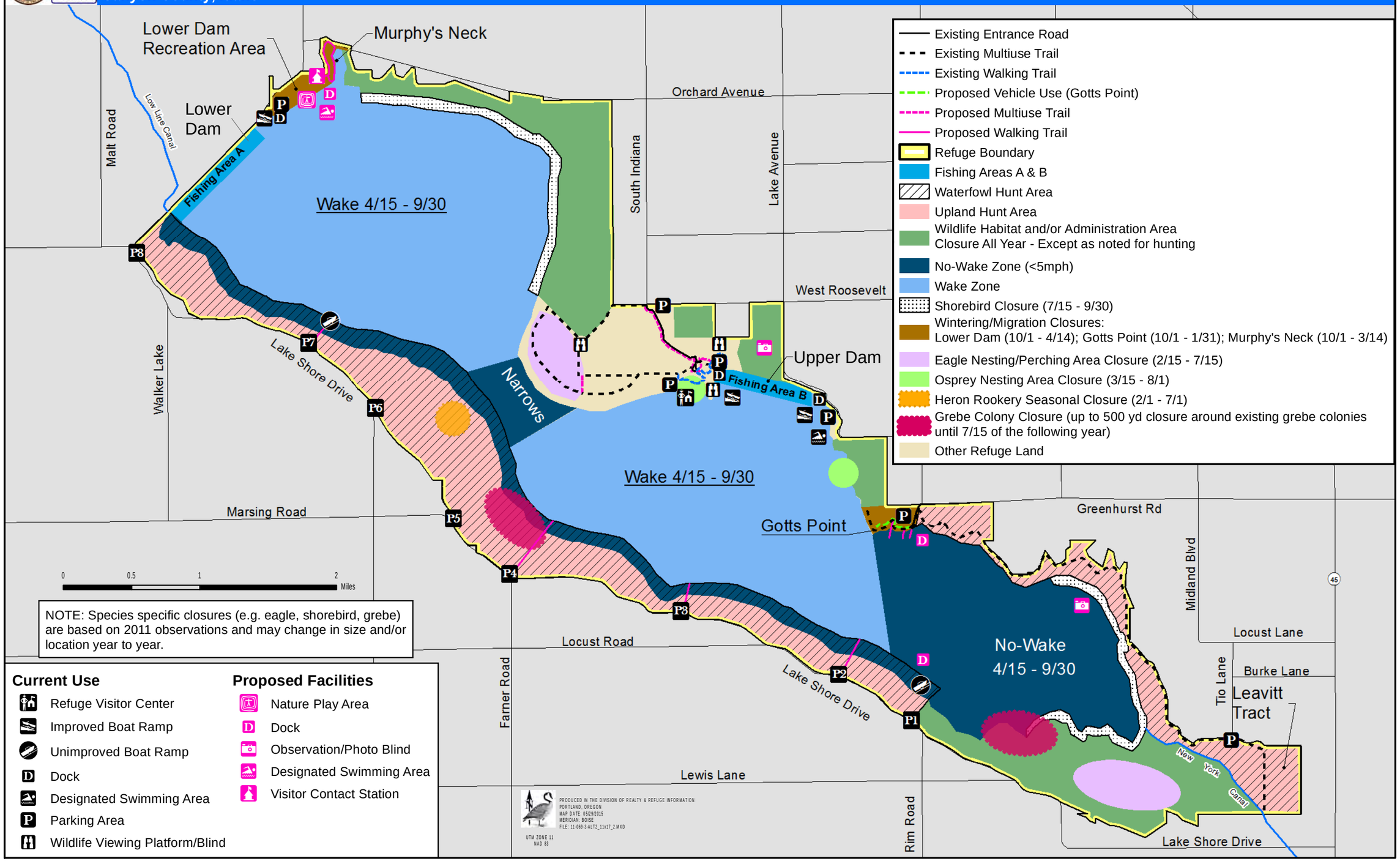
Rationale: Advanced knowledge of cultural resources can help in the design and implementation of restoration activities.

Objective 2.4.7.2. Present the Refuge's cultural resources
Work with Service Cultural Resources staff, interested Tribes, and the local community to interpret the Refuge's cultural resources.
Strategies Applied to Achieve Objective
Increase public awareness and appreciation of the Refuge's historic and archaeological resources through interpretation.
Partner with the Tribes, historical societies, and volunteers to provide cultural and natural heritage interpretation to existing EE programs.
Rationale: Understanding cultural resources serves to protect these resources and connect visitors, Refuge staff, and the local community with tangible elements of shared heritage.

U.S. Fish & Wildlife Service

Deer Flat National Wildlife Refuge - Lake Lowell Unit
Canyon County, Idaho

MAP 4 - Management Direction



- Existing Entrance Road
- Existing Multiuse Trail
- Existing Walking Trail
- Proposed Vehicle Use (Gotts Point)
- Proposed Multiuse Trail
- Proposed Walking Trail
- Refuge Boundary
- Fishing Areas A & B
- Waterfowl Hunt Area
- Upland Hunt Area
- Wildlife Habitat and/or Administration Area Closure All Year - Except as noted for hunting
- No-Wake Zone (<5mph)
- Wake Zone
- Shorebird Closure (7/15 - 9/30)
- Wintering/Migration Closures: Lower Dam (10/1 - 4/14); Gotts Point (10/1 - 1/31); Murphy's Neck (10/1 - 3/14)
- Eagle Nesting/Perching Area Closure (2/15 - 7/15)
- Osprey Nesting Area Closure (3/15 - 8/1)
- Heron Rookery Seasonal Closure (2/1 - 7/1)
- Grebe Colony Closure (up to 500 yd closure around existing grebe colonies until 7/15 of the following year)
- Other Refuge Land

Current Use

- Refuge Visitor Center
- Improved Boat Ramp
- Unimproved Boat Ramp
- Dock
- Designated Swimming Area
- Parking Area
- Wildlife Viewing Platform/Blind

Proposed Facilities

- Nature Play Area
- Dock
- Observation/Photo Blind
- Designated Swimming Area
- Visitor Contact Station

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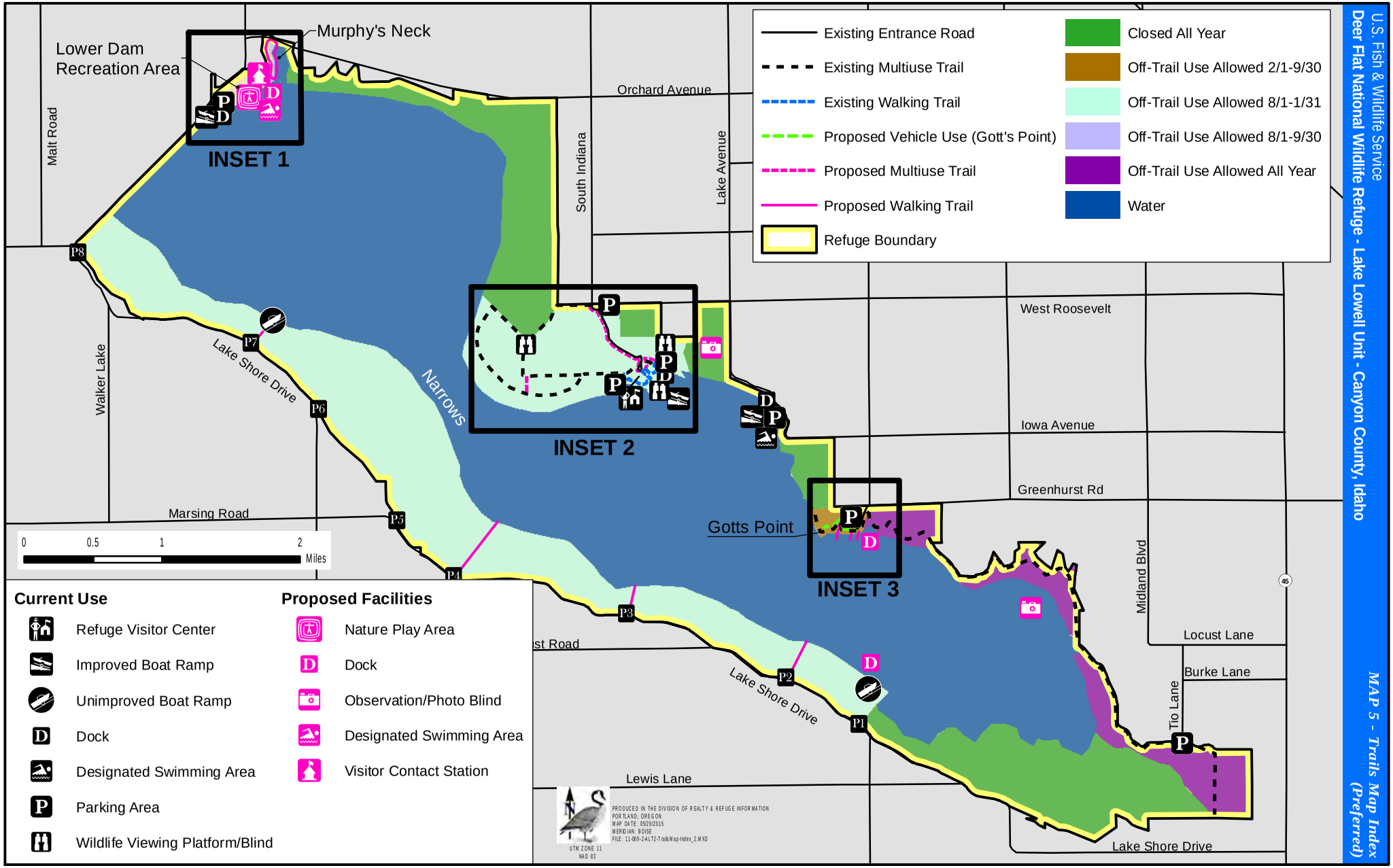
U.S. Fish & Wildlife Service
Deer Flat National Wildlife Refuge - Lake Lowell Unit - Canyon County, Idaho
MAP 5 - Trails Map Index (Preferred)
Existing Entrance Road
Existing Multiuse Trail
Existing Walking Trail
Proposed Vehicle Use (Gott's Point)
Proposed Multiuse Trail
Proposed Walking Trail
Refuge Boundary
Closed All Year
Off-Trail Use Allowed 2/1-9/30
Off-Trail Use Allowed 8/1-1/31
Off-Trail Use Allowed 8/1-9/30
Off-Trail Use Allowed All Year
Water
Lower Dam Recreation Area
Murphy's Neck
INSET 1
INSET 2
INSET 3
Malt Road
Orchard Avenue
South Indiana
Lake Avenue
West Roosevelt
Iowa Avenue
Greenhurst Rd
Midland Blvd
Locust Lane
Burke Lane
Tio Lane
Walker Lake
Lake Shore Drive
Narrows
Marsing Road
Gotts Point
st Road
Lewis Lane
P1
P2
P3
P4
P5
P6
P7
P8
0 0.5 1 2 Miles
Current Use
Refuge Visitor Center
Improved Boat Ramp
Unimproved Boat Ramp
Dock
Designated Swimming Area
Parking Area
Wildlife Viewing Platform/Blind
Proposed Facilities
Nature Play Area
Dock
Observation/Photo Blind
Designated Swimming Area
Visitor Contact Station
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PORTLAND, OREGON
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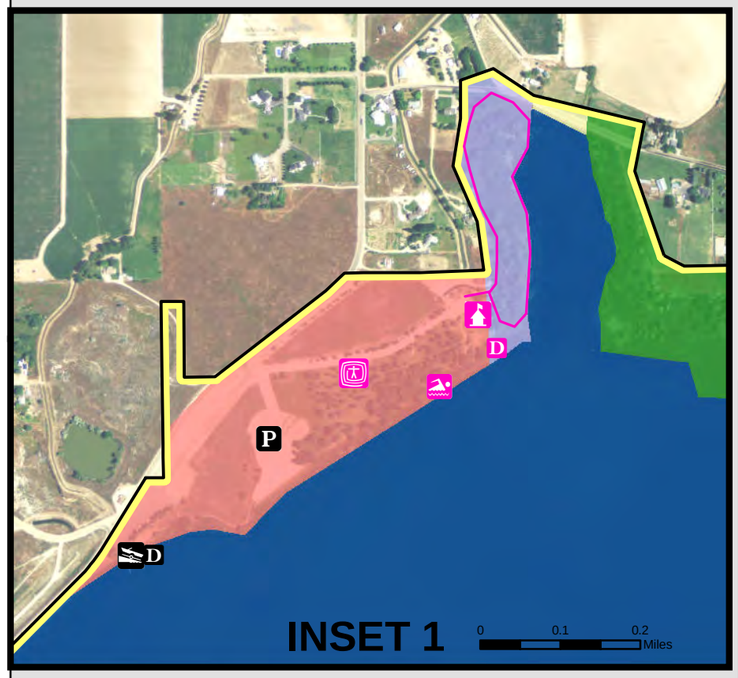
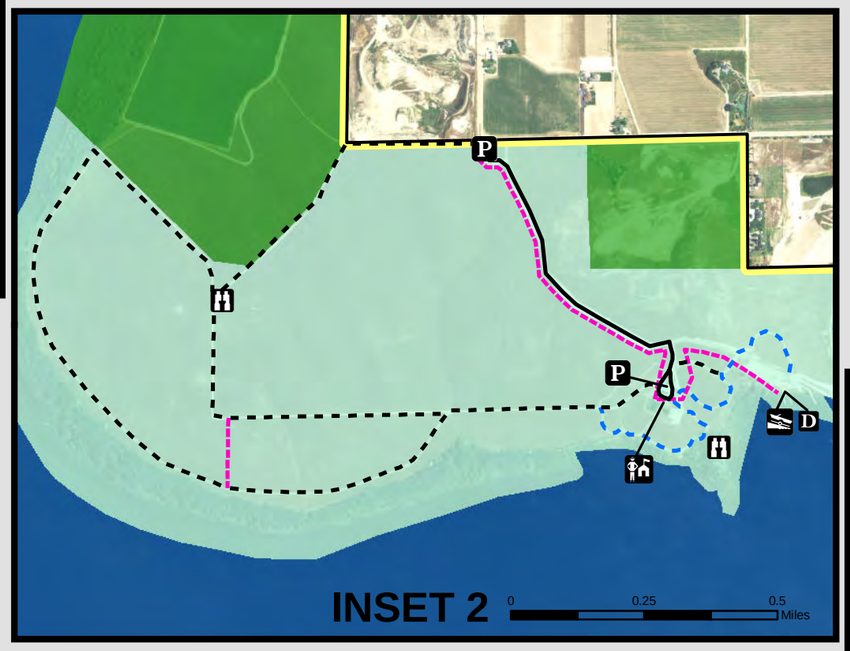
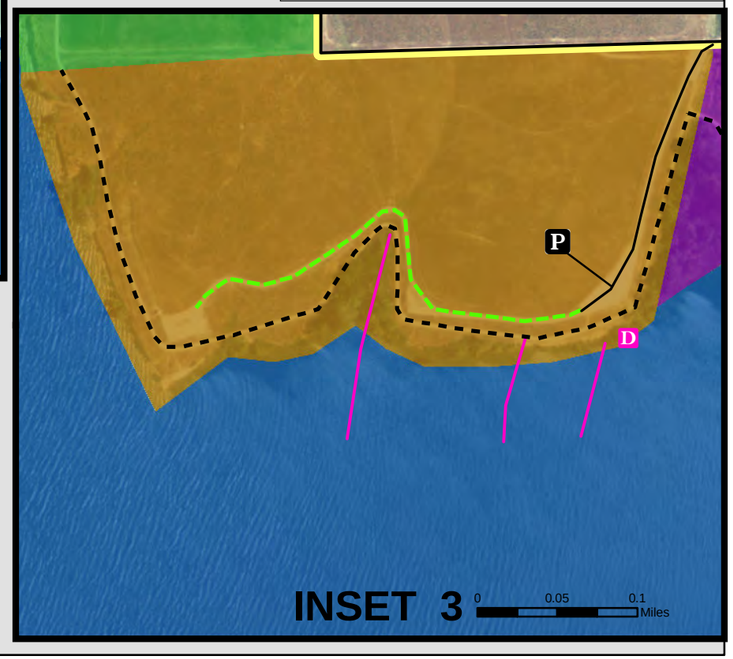
U.S. Fish & Wildlife Service
Deer Flat National Wildlife Refuge - Lake Lowell Unit
Canyon County, Idaho

MAP 6 - Trails Map - Inset Maps (Preferred)







- Existing Entrance Road
- Existing Multiuse Trail
- Existing Walking Trail
- Proposed Vehicle Use (Gotts Point)
- Proposed Multiuse Trail
- Proposed Walking Trail
- Refuge Boundary
- Closed All Year
- Off Trail Use Allowed 4/15 - 9/30
- Off-Trail Use Allowed 3/15 - 9/30
- Off-Trail Use Allowed 2/1-9/30
- Off-Trail Use Allowed 8/1-1/31
- Off-Trail Use Allowed 8/1-9/30
- Off-Trail Use Allowed All Year
- Water

Current Use

Type

- Refuge Visitor Center
- Improved Boat Ramp
- Unimproved Boat Ramp
- Dock
- Designated Swimming Area
- Parking Area
- Wildlife Viewing Platform/Blind

Proposed Facilities

- Nature Play Area
- Dock
- Observation/Photo Blind
- Designated Swimming Area
- Visitor Contact Station

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PORTLAND, OREGON
MAP DATE: 05/29/2015
MERIDIAN: BOISE
FILE: 11-869-2-ALT2-TrailsMap-InsetMaps_2.MXD

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